

A Primer on the Mechanics of Residential Mortgage Finance

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Overview

Background

During the past century, the residential mortgage finance market has undergone a number of dramatic changes. These changes resulted from a number of factors. Some of these factors came as a byproduct of the maturing of the industry which provided the historical context and data necessary to understand how various mortgage formats would respond to market forces over time. Other factors behind the innovations in mortgage products came from external sources, including the dramatic swings in interest rates and market fundamentals that occurred across various phases of the economic cycle. Finally, as the industry matured it became clear that there were opportunities to develop innovative solutions or niche products which could provide more customized solutions which could better satisfy the needs of segments of lenders, investors and borrowers.

Over time, the residential mortgage market has evolved into a complex industry with a variety of components, players, products and problems. Some of these problems manifest themselves at a broad industry level as in the case of the recent sub-prime mortgage problem, while others strike closer to home in the form of foreclosures on individual loans. That is, there are myriad ways to structure repayment of debt which can be yield neutral; lower initial payments can be offset by higher or longer future payments or, by a future lump payment. This opens the door to tremendous flexibility in structuring traditional mortgages, as well as to numerous “customized” mortgages.

As might be expected, the infinite combination of mortgage products that could be generated would overwhelm the market, creating an “apples to oranges” situation in which lenders, borrowers, investors and other parties would have a hard time keeping track of the overall market. Of particular concern to lenders would be the lack of liquidity of such products, which would prevent them from being packaged and securitized. Similarly, the sheer proliferation of products would make it difficult to model performance, thwarting efforts to price mortgages in terms of relative risk-reward, as well as develop portfolio strategies regarding the appropriate composition of mortgages. As such, residential mortgage options from traditional lenders and originators tend to follow certain patterns or guidelines, falling into discrete classes. However, this market dominance does not prevent smaller lenders, niche players, or “portfolio lenders” who originate for their own portfolios and are not concerned about liquidity, from offering an array of products. The constraints would come from government regulations and disclosure requirements, as well as demand from borrowers. Further, some of the more complex mortgage structures may emerge on a periodic basis to respond to market conditions (i.e., the subprime mortgage debacle) or to periods of market imbalance where lenders, builders and home-owners are faced with slow market in which existing product cannot be moved. Since necessity is the mother of innovation, variations of the types of mortgages and financing strategies presented in this primer take on increased importance. They can also be used to structure customized financial arrangements between borrowers and lenders in non-traditional situations or with specialized needs.

Despite the variation in mortgage products that could be offered to the market, they are all affected by underlying market fundamentals affecting supply and demand. Assuming they can be modeled in a financial sense, sophisticated risk management tools can be used to identify and mitigate some of the problems and help keep the industry in a state of balance and avoid dramatic swings across various phases of the market cycle. Unfortunately, these risk management programs are typically the purview of larger institutional players and are beyond reach for smaller players and individual borrowers. This results in something of an uneven playing field in which individual home buyers are at a disadvantage relative to their larger institutional counterparts upon whom they depend for mortgage products and capital.

In addition to having less access to more sophisticated econometric modeling and risk management programs, as a result of the innovations in mortgage offerings, individual homebuyers are faced with a confusing array of choices. Thus, selecting the right product can become a daunting task, especially with the various combinations and permutations of rates, fees, options among which the borrower could elect. Since lenders control the options—within governmental regulations—and terms, these factors are constantly changing in response to changes in market conditions and competitive forces. Similarly, the mortgage business has evolved into a massive industry in which the secondary market (i.e., the market for mortgage-backed securities) has grown to such an extent that investor appetites and rating agency models ripple back down the food chain and influence the nature and terms of mortgage products that are offered in the market. Since these players are removed from the industry and many have little appreciation for, or understanding of, the underlying market fundamentals behind individual loans, the industry is exposed to a number of forces that could trigger periods of mismatches between sources and uses of capital. Thus, during periods of capital surplus, loan origination standards may be compromised with attention shifted from managing risk to originating product. Similarly, during periods of low interest rates and rising prospects of increasing rates, borrowers may be skewed to products for which the likelihood of rising interest rate and foreclosure risk are at unacceptable—but unknown—levels as in the case of “teaser ARMS” in which income levels will not be adequate to absorb rising mortgage payments.

In this environment, an understanding of the basic mechanics underlying the wide array of mortgage products is of paramount concern to lenders, facilitators, regulators and borrowers. The objective of this primer is to explore the underlying mathematics behind the major classes of residential mortgages. Based on this insight, it is hoped that you will be able to make better choices in selecting your own mortgage options, helping clients and others select the appropriate mortgage for their particular needs, help the industry develop new mortgage products to address certain needs, and help understand and manage the financial risks involved in the residential real estate finance.

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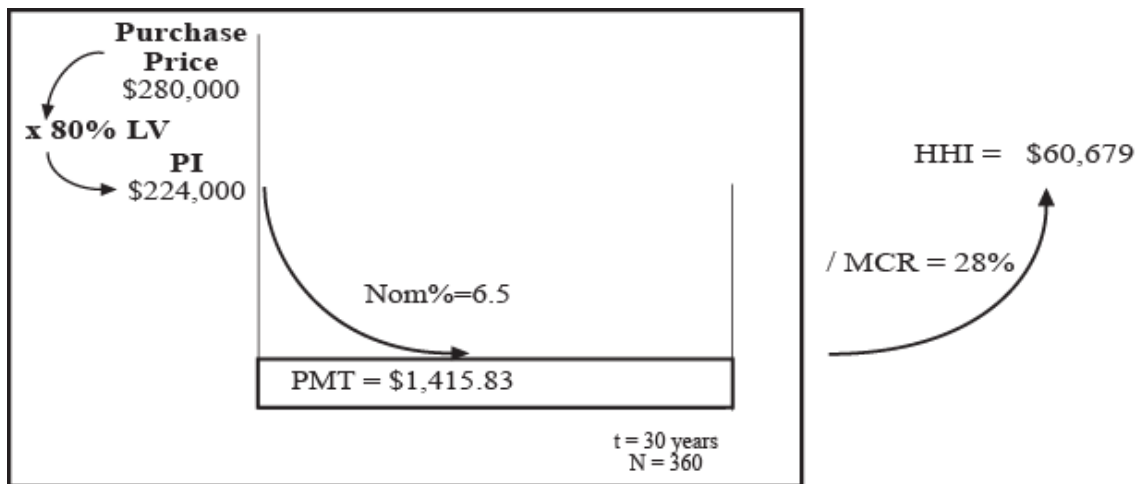
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Basic Valuation Analysis

Traditional Mortgage Finance

Before getting into the nuances of mortgage finance, it is useful to look at a simplified structure. That way, readers may be able to develop a better sense of the relationships among the various factors. Exhibit 1 demonstrates how traditional mortgage financing works. As noted, the maximum loan or Initial Principal (PI) is determined by multiplying the Purchase Price by the Loan-to-Value (LV) Ratio. In this case, the maximum loan is \$224,000 which complements the Initial Equity (EI) of \$56,000 to cover the total cost. Using financial calculations, the monthly Payment (PMT) required to generate the 6.5% annual, compounded monthly return to the investor is \$1,415.83. (note: we will defer the math involved until later). Given the Mortgage Capture Ratio (MCR) of 28%, the required Household Income (HHI) to “afford” the loan is \$60,679 (i.e., \$1,415.83/28%). Thus, if the borrower can come up with the \$56,000 downpayment, she can qualify for the \$224,000 loan.

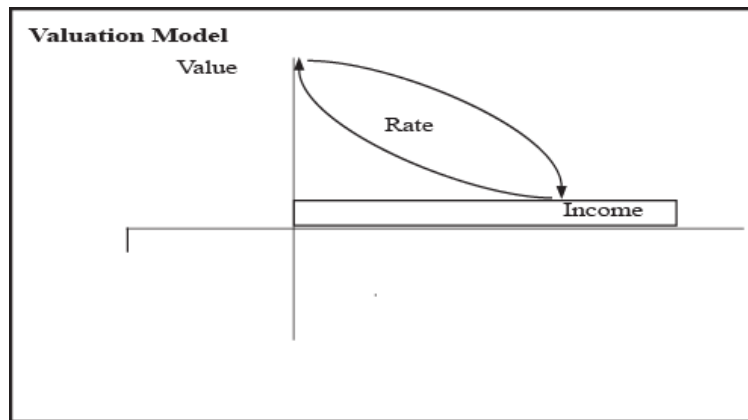
Exhibit 1: Conventional Mortgage Finance Structure



Basic Valuation Model

Exhibit 2 presents a simplification of real estate financial structure which applies to all investments. As noted, the basic equation is relatively simple. As noted, at some level the Value of an asset or investment is the Income that it generates, divided by the Rate of return that it must provide. Alternatively, the Income that must be generated is the Value times the required Rate of Return. It should be noted that this model does not consider the “Time Value of Money” or TVM. That is, it does not involve future value or present value calculations that are built into mortgage math.

Exhibit 2: Valuation



In looking at the simplified Valuation Model, several factors are noteworthy including:

- Value is obtained from the market.
 - For existing assets, the Value is typically the appraised Market Value or negotiated Purchase Price.
 - For new assets, the Value is the total cost necessary to create the asset including hard costs for land, materials and labor and all fees.
- Income is a function of the asset itself, its' earning potential and the expenses needed to support the income.
 - Income is really the Net Income the asset is expected to generate which is Gross Income less Operating Expenses.
 - In real estate, Income can be generated from rental revenue as well as fees and other sources, while Expenses can include a variety of Operating Expenses, some of which are fixed and some are variable or related to the level of services and/or quality of the asset.
- Rate is the periodic Rate of Return that the asset must generate to investors to provide an acceptable risk-adjusted return.
 - In real estate, due to the common use of leverage, the Rate is often a blended rate which combines the required return for the lender and the investor/owner.
 - In mortgages, the Rate often includes the "on" the investment (i.e., interest) and the return "of" the investment (i.e., loan amortization).

By algebraically manipulating the basic $\text{Value} = \text{Income}/\text{Rate}$ equation, the other variables can be isolated:

$$\begin{aligned} \text{Income} &= \text{Value} * \text{Rate} \\ \text{Rate} &= \text{Income}/\text{Value} \end{aligned}$$

Once these relationships are understood, the impact of a change in one of the variables can be isolated. For example, if Rates increase, the Value of a fixed Income stream will decrease (i.e., $\text{Value} = \text{Income}/\text{Rate}$). Similarly, if Rates decline, the Value will increase. On the other hand, if the Value rises, the Income necessary to provide a fixed rate of return also rises. By thinking through these basic

relationships, you should be able to understand why the recent decline in mortgage rates helped fuel the rise in housing prices. You should also be able to appreciate the housing affordability problem, since households with lower and moderate income may not be able to “afford” to make the required Income (i.e., mortgage) payments necessary to support the Market Value at which properties are trading. To close this gap,

- Values must come down (e.g., housing prices must fall, households must opt for cheaper housing, or downpayments must increase to reduce the Initial Principal),
- Rates must come down (e.g., a decline in mortgage rates overall or access to subsidized financing), or
- Incomes must rise (e.g., actual income increases due a raise, an extra job, or a new job).

As an alternative to the previous changes, the Value proposition can be manipulated by modifying the underlying relationships by “structuring” financing. For example,

- Values (i.e., the amount borrowed) could be reduced by:
 - Providing a subsidy which would lower the amount that has to be borrowed.
 - Providing a “tax credit” which could be used at closing to free up more cash for the downpayment.
- Rates (i.e., the required periodic payment rate) could be reduced by:
 - Converting to adjustable rate loans which shift some of the risk to the borrower thus reducing the “spread” necessary to compensate for interest rate risk.
 - Reducing default risk by increasing mortgage guarantees, personal guarantees or other sources the supplement the collateral.
 - Accessing below market rates available through various housing organizations or capital providers.
 - Internally subsidizing returns by providing equity participation in which the lender would gain some of the required return from Income in the form of periodic payments, and some from a percentage of the appreciation.
 - Extending the period of time over which the loan is repaid to reduce amortization (e.g., shift to a 40 year loan from a 30 year loan.
 - Using an “interest-only” loan in which there is no return “of” investment during the term of the loan.
 - Reducing the initial “Pay Rate” through the use of a graduated structure in which the borrower would agree to higher payments later on to compensate for lower initial payments.
 - Using a “balloon” or “bullet” loan structure in which the return “of” the investment is postponed until specified due dates and still allow a longer period of amortization to lower payments and reduce interest rate risk by shortening the period of exposure.
- Income (i.e., capital capture ratios) could be increased by:
 - Increasing the Mortgage Capture Ratio by allowing borrowers to take on higher risk.
 - Accepting “soft income” which is claimed by borrowers but is conditional and somewhat speculative or uncertain.

- Subsidizing incomes through the use of separate accounts which would supplement the purchasing power of the borrower up front.
- Extending the capital capture ratio of fixed income

Residential Mortgage Overview

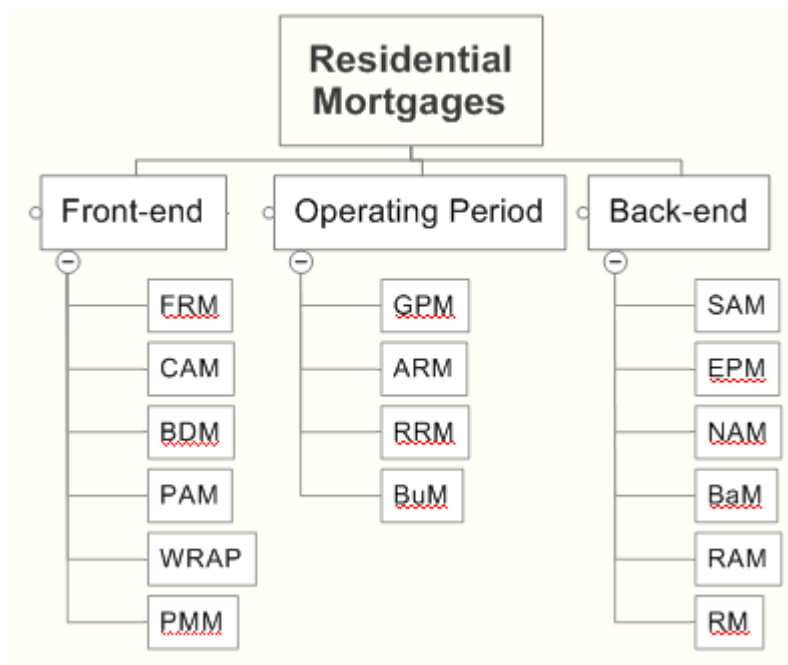
Organization

In order to efficiently introduce the mechanics of alternative mortgage instruments, three strategies are incorporated. First, before delving into the mechanics of the individual mortgages, they are classified into discrete categories based on the timing of their impact. Second, to standardize the analysis, the assumptions presented in Table 1 are adopted as a base problem. Given this base, the nuances in the numerical calculations and mechanics of alternative mortgages can be compared and contrasted against a “traditional mortgage” and other types and classes of mortgages. Third, a standard set of topics, tables and graphics are generated for each of the mortgages. Fourth, to focus on the mechanics of the programs, the structures are held to a minimal level. However, advanced readers can replicate the results and extend them to more realistic cases by extracting the appropriate factors from various market sources and modeling them with financial analyst calculators or spreadsheets. Finally, where appropriate the equations and supporting calculations are presented in Excel format.

Typology of Mortgages

As noted in the introductory comments, the basic $\text{Value} = \text{Income}/\text{Rate}$ axiom can be used to explain many of the idiosyncrasies of the various mortgage products. Exhibit 3 presents a typology or classification of alternative residential mortgage products.

Exhibit 3: Typology of Residential Mortgages

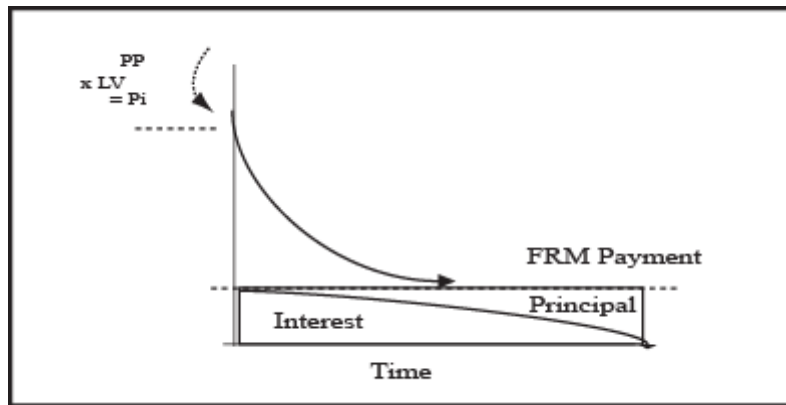


As noted in the exhibit, the mortgages can be grouped into three categories. The rationale behind the creation of these categories and a brief explanation of the respective mortgages include:

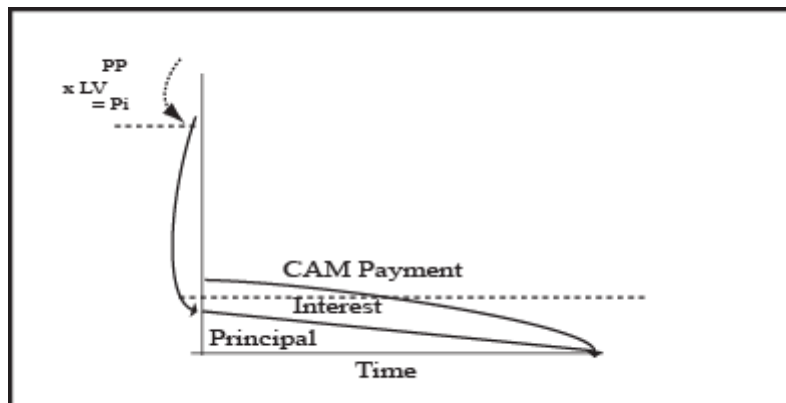
Front-end Mortgages

These mortgages share the common element of concentrating on the magnitude or level of the initial mortgage that can be captured by a borrower with a given income and downpayment.

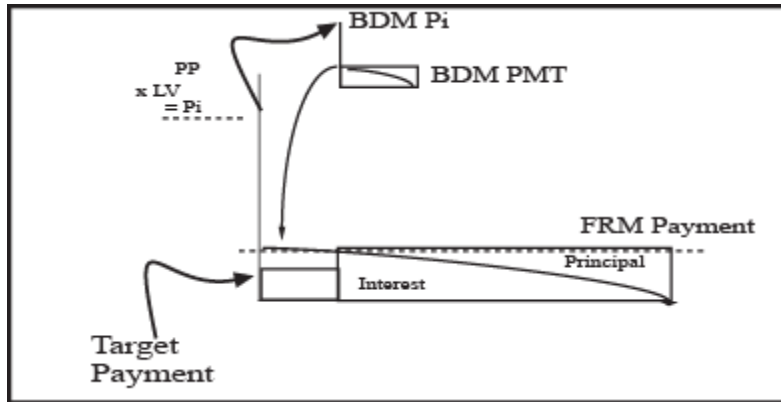
- **FRM.** The Fixed-rate Mortgage is the “classical” mortgage by current market standards. It is distinguished by the fact that the “Rate” is determined by the Mortgage Coefficient (Mc) through which the periodic payments are set at a level which will provide a return “on” the investment at the specified interest rate, as well as a return “of” the investment in the form of complete amortization (i.e., loan repayment) over the term of the loan.



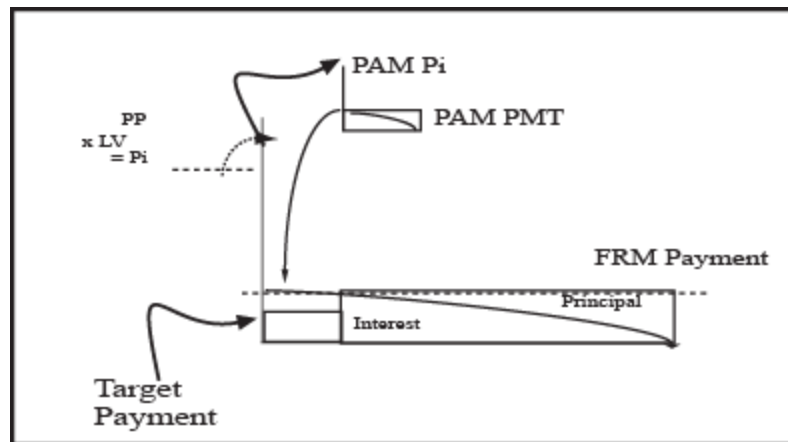
- **CAM.** The Constant Amortization Mortgage actually preceded the FRM in terms of product innovation, emerging on the scene in the early 1900s as means of encouraging homeownership. As opposed to the “constant payment” FRM, the CAM focuses on “constant amortization.” Since interest is only due on the outstanding balance, the interest payments decline over time causing a compensating decline in total payments (i.e., total payments = interest plus amortization).



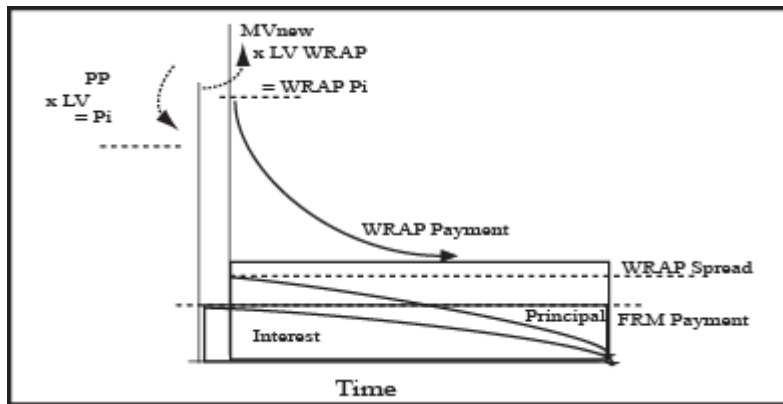
- **BDM.** The Buydown Mortgage is a type of creative financing in which the seller --in many cases a homebuilder with excess product-- agrees to set aside a portion of the purchase price in a special mortgage account, often working with the lender. This account, which earns a moderate rate of interest, is drawn down over a relatively brief period of time, thus resulting in a fairly deep front-end subsidy. In effect, the lender receives the same fixed payments as in a FRM, but part of the proceeds comes from the BDM account and the residual from the borrower. Once the BDM is liquidated, the net payments to the borrower step up to the initial level.



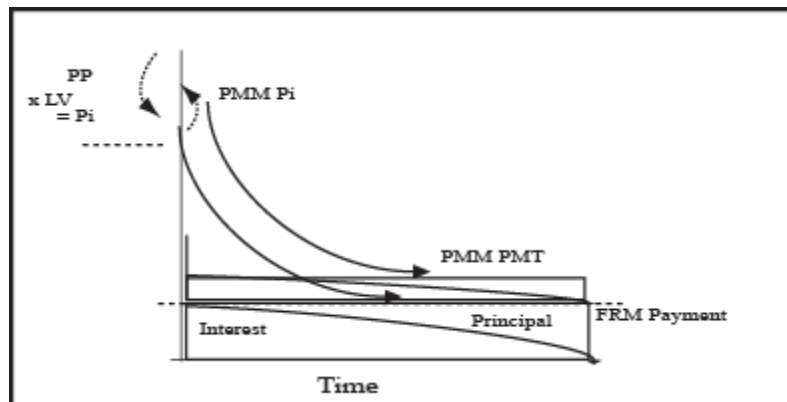
- **PAM.** The Pledged Account Mortgage is similar to the BDM, although the sources of funding differ. In the PAM, the lender agrees to advance a higher loan than would typically be provided under a conventional LV ratio of some 80%. A portion of the excess proceeds are set up as a separate PAM which earns a moderate rate of interest and is drawn down over a relatively short period of time. As in the BDM, the lender receives a gross payment equal the level needed to amortize the loan as in a FRM, although during the term of the PAM, the borrower only makes the net payment. Once the PAM account is liquidated, the borrower's payments step up to the full payment necessary to amortize the loan which, in this case, is higher than in a FRM since it is the source of funding for the PAM.



- **WRAP.** A Wraparound Mortgage is a financing technique that is designed to extend the life of a current loan with attractive terms beyond the ownership period of the borrower. In effect, the initial borrower sells the property to a third party using “seller financing” for the entire amount of the new loan. This new loan is negotiated, but essentially involves applying an agreed LV ratio to the then-current market value. Assuming the market value of the property has increased, the amount of the new loan exceeds that of the existing mortgage. The new borrower then makes mortgage payments to the seller who: 1) pays the existing underlying mortgage per the initial agreement, 2) and pockets the spread between the new payments and the existing mortgage payments. In effect, the seller earns interest on the amount of new money they provided to the buyer, as well as the spread or arbitrage on the differences between the new loan rate and the existing underlying rate. The buyer is able to acquire the property for a lower down payment and enjoys lower rates than available in the current market. The title remains with the seller and the existing mortgage remains in place.



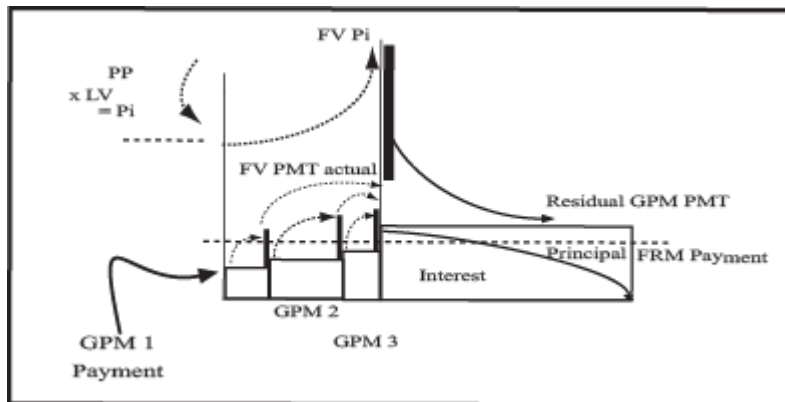
- **PMM.** The Purchase Money Mortgage is a form of seller financing in which the seller provides a new loan for a portion of the gap between the amount the borrower can secure from a lender applying LV ratio tests, and the amount needed to acquire the property. Such an arrangement may also be entered into to help a borrower qualify for a loan which exceeds the amount they buyer can afford using traditional mortgage/income tests, or to help raise the downpayment. In effect, the buyer takes on a junior loan at the closing which is then repaid at some agreed rate --typically higher than the FRM-- over some agreed period of time. This PMM may be structured in a number of ways with or without amortization and for a term that matches the needs of both parties.



Operating Period Mortgages

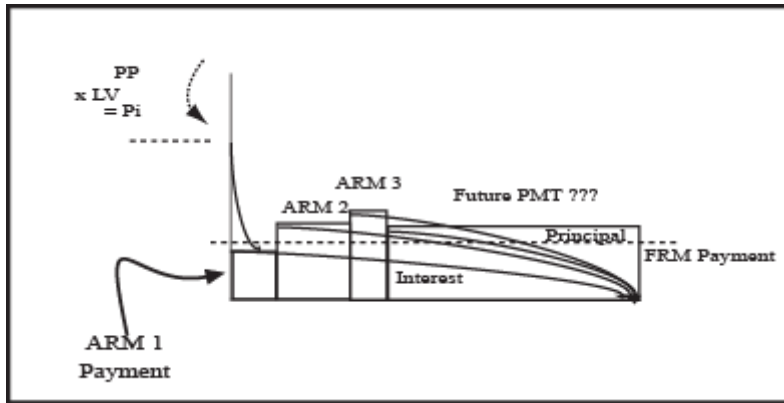
This class of mortgages is distinct in the sense that they focus on the pattern and level of payments that occur during the operating period in which the outstanding loan is being repaid. While their ability to lower initial required payments helps increase the “capital capture potential” or borrowing power of a household on fixed income, they do so during the operating period.

- **GPM.** The Graduated Payment Mortgage is a structured form of financing in which the periodic payments are increased at scheduled times by scheduled amounts. In effect, the borrower is facing a known step payment pattern in required payments. In return for the lower initial payments --which increase the purchasing power of the borrower-- the future payments are incremented by an offsetting amount. Under a fixed rate version of GPMs, the current Present Value of the stepped payments is equivalent to initial principal balance after being discounted by the mortgage rate. This is achieved by carrying the gap between the pay rate (i.e., level of the steps) and the earned rate (at the mortgage rate) forward to a future value, and then calculating the residual payments that are necessary to fully amortize the loan over the residual term. In a variation of the GPM, the earned rates over the deferral period, as well as the rate over the residual term, can fluctuate according to some index, creating an “adjustable rate” loan in which interest rate risk is shifted to the borrower.

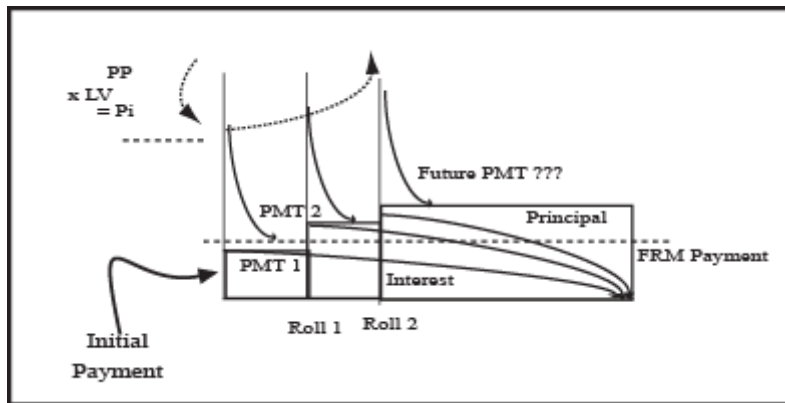


- **ARM.** An Adjustable Rate Mortgage is a mortgage arrangement in which the borrower accepts interest rate risk, with payments rising or falling depending on changes in some benchmark index. In return for the added risk, the lender typically offers ARMs at slightly lower rates to “entice” borrowers seeking to lower their mortgage payments or to “stretch” their Mortgage Capture potential. In an ARM, the earned rate of interest will be reset at fixed time periods and then remain constant until the next scheduled adjustment period. There are three major options for treating changes in interest rates: adjusting the monthly payment; extending the term of the loan at constant payments; or, maintaining payments and term but increasing the outstanding principal balance. To protect the

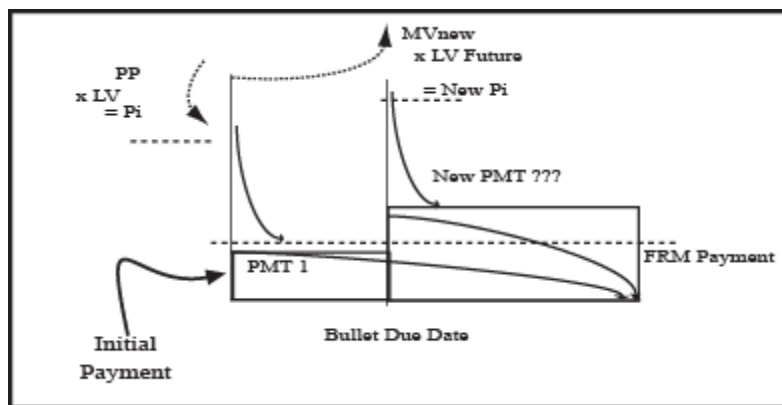
borrower from excessive payment risk, the change per step and the cumulative change for the entire loan may be capped. In some arrangements, the amount that would have been “earned” over the cap is written off, while in other arrangements the “pay rate” is capped and the residual between the paid rate and earned rate is compounded forward as negative amortization.



- **RRM.** The Renegotiable Rate Mortgage is comparable to the ARM loan in some respects, although the loan arrangement may expose the borrower to greater payment risk since the pay rate may not be capped, depending on how the arrangement is structured. As in ARMs, the earned rate of interest may be “renegotiated” at set intervals. In essence, this renegotiation will depend on then-current mortgage market conditions, rather than on some specified index. This has the advantage of protecting the lender from spread compression which may occur between various indices and actual mortgage terms. To protect the borrower, the lender typically guarantees the “renegotiation or rollover” of the outstanding principal balance, thus ensuring that funds will be available to continue supporting ownership of the underlying property. Since a new mortgage is not required -- the current loan is merely “renegotiated” the lender can maintain a first mortgage claim without the risk of intervening liens slipping in between negotiations.



- **BuM.** A Bullet Mortgage is more common in commercial transactions, although it may be applied to residential transactions as well. In essence, a BuM involves a mortgage arrangement in which the principal is due at some pre-specified period prior to the amortization term of the loan. This arrangement allows the borrower to stretch payments over a longer period thus reducing the amortization component. However, there are no guarantees that the lender will be willing to roll the loan over at the maturity dates, exposing the borrower to liquidity or refinancing risks. In some cases, the lender will be willing to offer a new mortgage to avoid the risk of foreclosure. However, if the market value declines or the borrower is not “eligible” for a new mortgage due to LV restrictions or MCR, the lender can force repayment thus triggering liquidation of the asset and repayment or initiating foreclosure proceedings.

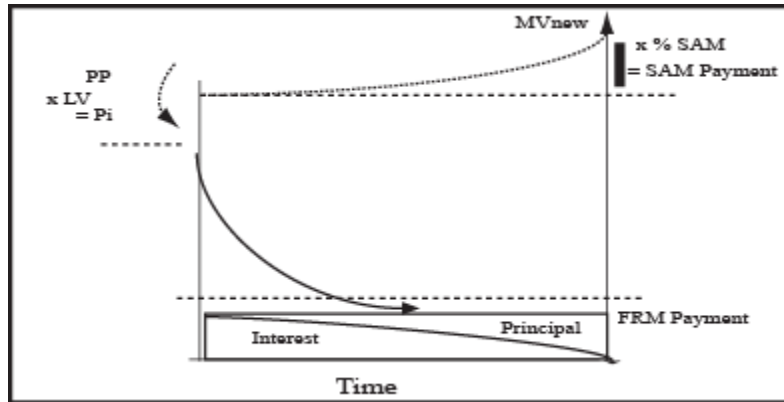


Back-end Mortgages

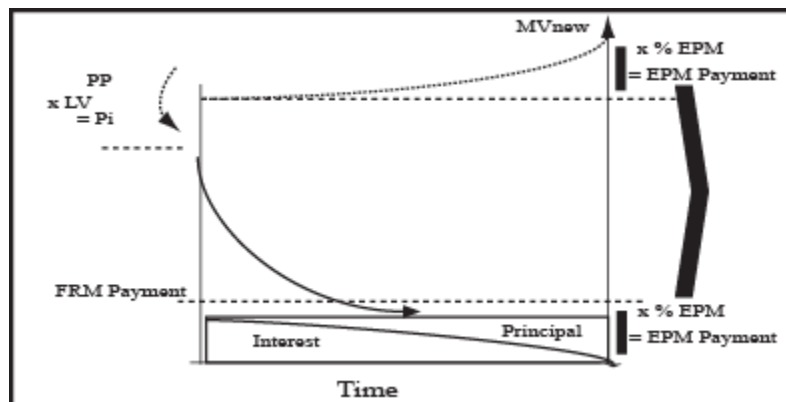
This class of mortgages is juxtaposed against the Front-end Mortgages, impacting on the Residual Principal Balance that is left at the end of the holding period (i.e., time from inception to termination or repayment) or the term if the mortgage is held to maturity. In general, these instruments result in an increase or partial reduction in mortgage balances, or the addition of an equity “kicker” or sharing of the Net Terminal Value upon sale or termination.

- **SAM.** In a Shared Appreciation Mortgage, the borrower gives up a portion of the potential appreciation that may occur over time in return for a lower mortgage interest rate. This option provides a lender with upside potential whereby they can capture some of the equity benefits without incurring the risks. In the case a property does not appreciate, the lender merely foregoes the potential upside and relies on the contract interest rate for compensation. On the other hand, if the property increases in value, the lender will be eligible to receive a pre-specified proportion of the gains after selling expenses and other charges are deducted. The arrangement can be used to help the borrower qualify for a loan and reduce periodic mortgage payments. To provide some

certainly to the arrangement, the appreciation kicker will be paid upon sale of the property or, depending on negotiations, at some predetermined time periods. In the latter option, the property would be appraised to determine the “earned” equity kicker due to the lender. This amount can be paid in cash, or can be rolled into the mortgage balance creating an additional residual claim.

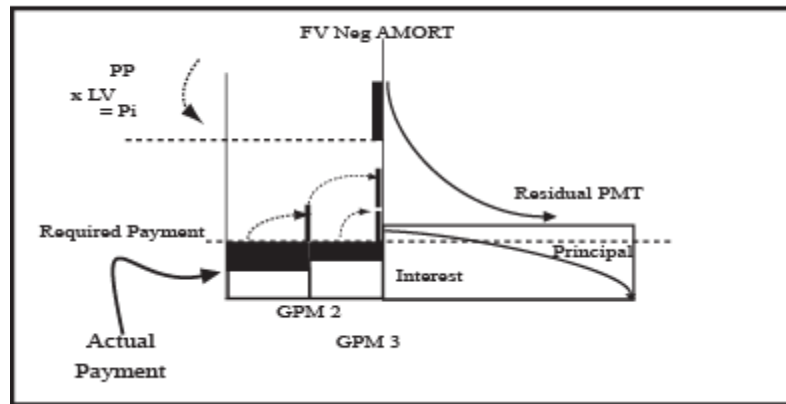


- **EPM.** An Equity Participation Mortgage is similar to a SAM, with the major difference being the fact the borrower gives up a portion of their equity interest that will be built up through loan amortization. This “earned equity position” is combined with the appreciation component to determine the aggregate equity kicker. As with the SAM, the EPM settlement would occur upon sale, or at pre-specified periods. Depending on the contractual agreement, the proceeds from interim re-sets could be paid in cash or rolled into the mortgage. If they are added to the principal balance, the term could be extended, payments could increase, or the loan could flip to a partially amortizing loan with a balance due upon termination.

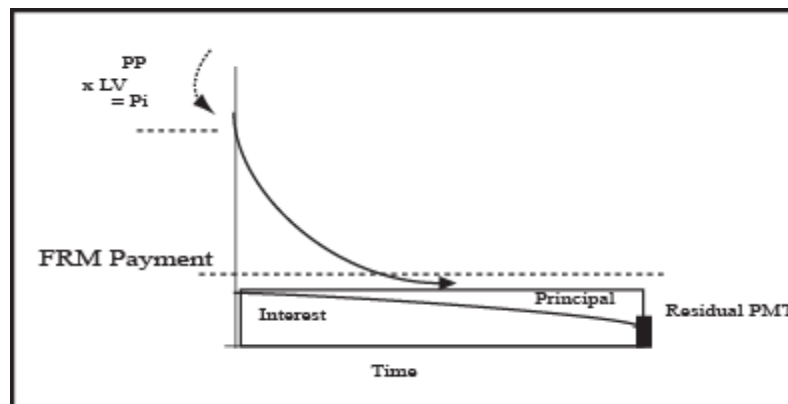


- **NAM.** In a Negative Amortization Mortgage, the periodic payments would be set at a level below that required to amortize or provide a return “on” and “of” the amount of the

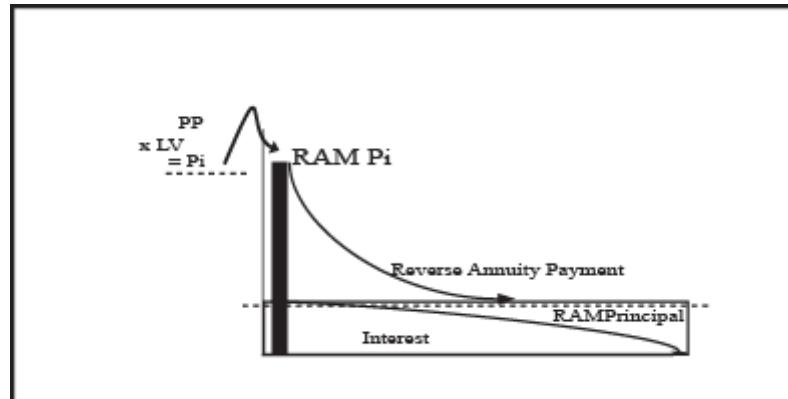
loan. This lower “pay rate” would be offset by an accumulation of the deficiency which would be compounded forward and added to the outstanding principal balance. In effect, the borrower would be increasing the loan above the amount supported by the initial LV ratio. If the property appreciated at a faster rate than the accumulation of the deficiency, the implicit, current period LV ratio could actually decline, thus providing a greater cushion against losses in the event of foreclosure. In some cases, the principal balance could be capped at some LV ceiling based on current market values. In those cases, the principal balance could be frozen, forcing an increase in the required payments to provide some level of mortgage amortization.



- **BaM.** A Balloon Mortgage is a form of a partially amortizing loan wherein the periodic payments are established at a level which will leave a residual payment at the end of the loan term. The underlying strategy is to reduce periodic payments by shifting a portion of the amortization to the back-end of the transaction. In essence, the agreed residual principal balance is established prior to inception. This may be a fixed dollar amount, a percent of the initial value, or a percent of the anticipated value given expected property appreciation. Regardless of how it's set, once the future dollar value of the terminal position is established, the sinking fund or bond equivalent draw to grow to that amount would be calculated. This figure would then be subtracted from the required payment necessary to fully amortize the loan, generating a net payment. Upon termination, the borrower would sell or refinance the property and pay the outstanding principal balance in a lump payment.

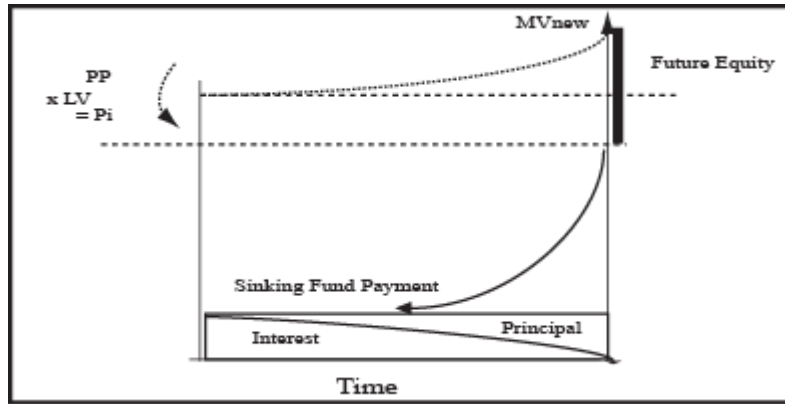


- **RAM.** In the case of older homeowners, many are in a situation in which they are long on real estate and short on income and liquid assets. At the same time, many own their personal residence outright. Since they have limited or reduced income, they may not qualify for a traditional mortgage in which the lender looks to the MCR to ensure the borrower has sufficient income to cover fixed mortgage payments. At the same time, the value of the house is adequate to ensure that there is sufficient capital to repay the loan after the house is sold. While the homeowner could sell their house and use the proceeds to generate current income, this approach has several disadvantages (e.g., tax implications, loss of control via ownership transfer, and ineligibility for needs' based entitlement programs). The Reverse Annuity Mortgage (and its companion, the Reverse Mortgage) were designed to address this demand. In the RAM, the specified amount of capital based on an LV ratio would effectively be transferred to the borrower up front, with the proceeds used to fund a fixed-term, fixed rate annuity. This annuity, which would earn interest, would be drawn down over time, holding the loan constant. At the end of the term of the annuity, the lender would have a claim against the collateral value of the property equal to the value of the annuity. In case the property was sold prior to the liquidation of the annuity, the proceeds could be distributed to the borrower and/or their heirs. In case the owner wished to retain ownership beyond the term of the annuity, the arrangement could be repeated or the mortgage could be refinanced.



- **RM.** The Reverse Mortgage addresses the same needs as the RAM, although the approach is significantly different. Rather than advancing the agreed-to sum up front, the future amount of the mortgage value is specified. This amount is based on application of some LV ratio to the current market value, with possible adjustments based on the quality of the property and financial situation of the borrower which might provide additional protection against loss. Once the future value is set, the sinking fund or annuity payment that could be drawn off is determined. This sinking fund is then compounded forward at the specified mortgage interest rate, creating an increasing claim against the collateral.

Assuming the house holds its value, at the end of the term the LV ratio matches the initial agreement. In most cases, however, the house would be expected to appreciate in value, thus providing an additional cushion to cover repayment. If the borrower wishes to retain ownership, the mortgage can be refinanced or otherwise recapitalized.



As noted, the Front-end, Operating Period and Back-end mortgage classes share some commonalities and have some differences. The typology is not formally embraced in the market, but provides a useful framework by which you can begin to understand the complex array of financial arrangements. Regardless of how you classify mortgages, you should see that they are all based on traditional Time-Value-of-Money (TVM) calculations. Although there is tremendous flexibility in how mortgages can be structured, the basic Value = Income/Rate model is followed along with attendant consideration of the TVM implications. At the end of the day, lenders and borrowers make decisions based on required returns and risks. This basic axiom will become more obvious as we explore the mechanics of the various loan programs.

Base Case Scenario

To allow you to develop an understanding of the differences among the various mortgage products, a common set of assumptions is used for each mortgage. This base case includes:

Table 1: Base Assumptions

Mortgage Assumptions			Code
Purchase Price	\$ 280,000		PP
Mortgage Terms			
Loan-to-Value	80%		LV
Rate	6.50%		Mi
Term	30		t
Periodicity	12		N
Mortgage Fees			
Origination Fee	1%		FeeO
Points	2%		Pts
Prepayment Penalty	2%		PP
Equity Capital			
Mortgage Capture Ratio	28%		MCR
Expected Holding Period	10		E(HP)
Cost of Capital	10%		Ec

These are typical variables that would be used in considering a mortgage or in comparing mortgage options. Depending on the nature of the underlying decision, some of the variables may not be applied. Once the core assumptions have been made, the capital structure can be calculated:

Sources of Capital	Value	Code
Initial Principal	\$ 224,000	Pi
Initial Equity	\$ 56,000	Ei
Total Capital	\$ 280,000	Tcap

$$P_i = \text{Initial Principal}$$

$$= PP * LV$$

$$= \$280,000 * 80\%$$

$$= \$224,000$$

$$E_i = \text{Initial Equity}$$

$$= PP - P_i$$

$$= \$ 280,000 - \$224,000$$

$$= \$ 56,000$$

Once the sources of capital have been determined, the mortgage payments, amortization schedule and other financial elements surrounding the required payments can be calculated. Given these inputs, attention can shift to calculating the Household Income (HHI) required to support the mortgage, as well as the Annual Percentage Rates (APR).

As noted, it is assumed that the “Mortgage Capture Ratio” or MCR, is 28% of annual household income (HHI). That means that the maximum monthly mortgage payment at origination cannot exceed 28% of the household’s gross monthly income. This “rule of thumb” has been developed over time to ensure that borrowers have sufficient disposable income beyond their mortgage obligation to fund other household necessities and avoid stretching their budget to a level in which the risk of foreclosure rises to unacceptable rates. When other mortgage-related fixed charges are considered (i.e., property taxes and insurance) this ratio rises to 33% under typical market conditions. However, in this case we are focused on the direct 28% MCR which in some situations will become the constraining factor. Once the required mortgage payments have been determined, the qualifying income can be calculated by:

$$HHI_r = \text{Household Income Required}$$

$$= \text{Mortgage Payment/MCR}$$

By reversing the equation, the “affordable” loan can also be calculated. That is,

$$MP_a = \text{Mtg Payment Affordable}$$

$$= HHI * MCR/M_c$$

$$\text{Where: } M_c = \text{Mortgage Payment Required to Amortized } \$1$$

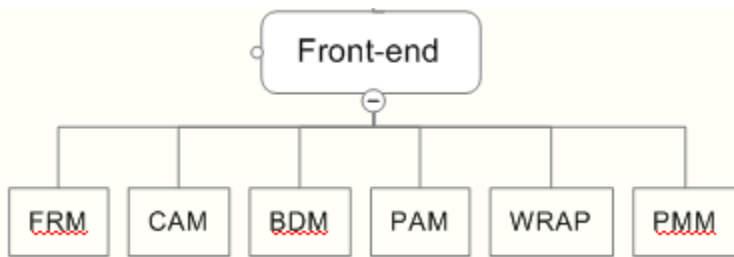
Mortgage Mechanics

Front-end Mortgages

Introduction

The first class of mortgages, Front-end, are distinguished by the fact that they focus on the magnitude or level of the initial payments. This commonality is important since these “payment” levels directly translate into the maximum mortgage that a borrower can attract to supplement a downpayment. Under traditional mortgage financing, this combination of debt and equity determines the maximum price that a borrower can bid for a particular property.

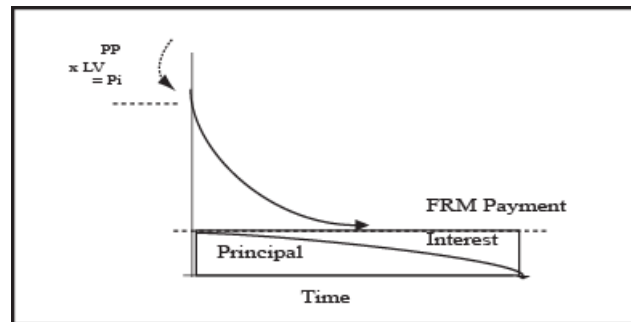
Exhibit 4: Front-end Mortgages



Fixed Rate Mortgage (FRM: aka Traditional Fixed Payment)

Overview

In the period extending from the post-depression era to the early 1970s, the term “mortgage” was a generic label for one major type of mortgage instrument; the rate, fully amortizing mortgage. Under traditional mortgage instrument, the borrower makes a constant payment over full term of the mortgage. The amount of constant payment is somewhat higher than would be if it represented the interest alone. In the FRM, the “Rate” is determined by the Mortgage Coefficient (Mc) through which the periodic payments are set at a level which will provide a return “on” the investment at the specified interest rate, as well as a return “of” the investment in the form. The excess of the constant payment over the interest charge is allocated to reduction of the principal balance of the note which gradually declines until it reaches zero. In real estate and finance, this process of principal reduction is referred to as “loan amortization.”



fixed
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FRM Base Case

Table 2: FRM Base Case

Mortgage Assumptions	Value	Code
Purchase Price	\$ 280,000	PP
Mortgage Terms		
Loan-to-Value	80%	LV
Rate	6.50%	Mi
Term	30	t
Periodicity	12	N
Mortgage Fees		
Origination Fee	1%	OrigFee
Points	2%	Pts
Prepayment Penalty	2%	PP
Equity Capital		
Mortgage Capture Ratio	28%	MCR
Expected Holding Period	10	E(HP)
Cost of Capital	10%	Ec

Using the basic inputs, the required mortgage payment necessary to amortize the loan can be calculated using a financial calculator, Excel or the raw equations.

In Excel, the equation is:

$$=PMT(Mi/N,t*N,Pi)$$

Where:

PMT	=	Excel Periodic Repayment Equation
Mi/N	=	Mortgage Interest Rate in Months
t * N	=	Amortization Period in Months
Pi	=	Initial Principal
	=	PP * LV

RRM Visualization: Cash Flows and Principal Balance

Once the basic financial model is set up, the mortgage payments can be graphed as in Exhibit 5. As noted, in the FRM the outstanding Principal Balance at the end of each period (P-EOP) declines at an accelerating rate to fully amortize or pay off the initial Principal Balance at the end of the amortization period. At any point in time, the outstanding Pb can be calculated and repaid in full to retire the debt. The exhibit also shows the pattern of payments which, in the early years are primarily interest, and in the latter years shift to principal reduction (i.e., amortization). This calculation stems from the fact the payments are fixed, and the borrower only owes interest on the outstanding balance at the beginning of each period or year (i.e., P-BOP).

Exhibit 5: FRM Cash Flows and Principal Balance

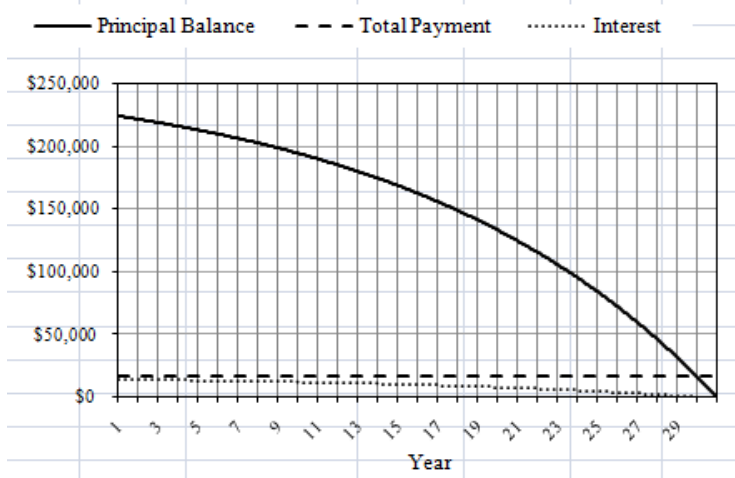


Table 3 indicates how a loan amortization schedule can be set up for a FRM. As noted, the payments are made at the end of each period which, in this example, is monthly. Thus, the Prin BOP begins with the Pi (PP * LV). The PMT or monthly payment is then calculated using the PMT function in Excel. This payment can be allocated between Interest (INT) and principal reduction or loan amortization (AMORT) by calculating the INT payment:

$$\text{INT} = \text{Prin BOP} * \text{Mortgage Interest Rate (Mi)}$$

Then, by subtracting the INT from the PMT, the residual or amount of Amortization or principal repayment can be calculated:

$$\text{AMORT} = \text{PMT} - \text{INT}$$

Now, the outstanding principal balance at the end of the year can be calculated:

$$\text{P-EOP} = \text{Prin BOP} - \text{AMORT}$$

FRM Mechanics

Table 3: FRM Monthly Amortization

Year	Mo	Prin BOP	PMT	INT	AMORT	Prin EOP
			(\$224,000)			\$224,000
1	1	\$224,000	\$1,416	\$1,213	\$ 202.50	\$223,798
1	2	\$223,798	\$1,416	\$1,212	\$ 203.60	\$223,594
1	3	\$223,594	\$1,416	\$1,211	\$ 204.70	\$223,389
1	4	\$223,389	\$1,416	\$1,210	\$ 205.81	\$223,183
1	5	\$223,183	\$1,416	\$1,209	\$ 206.92	\$222,976
1	6	\$222,976	\$1,416	\$1,208	\$ 208.04	\$222,768
1	7	\$222,768	\$1,416	\$1,207	\$ 209.17	\$222,559
1	8	\$222,559	\$1,416	\$1,206	\$ 210.30	\$222,349
1	9	\$222,349	\$1,416	\$1,204	\$ 211.44	\$222,138
1	10	\$222,138	\$1,416	\$1,203	\$ 212.59	\$221,925
1	11	\$221,925	\$1,416	\$1,202	\$ 213.74	\$221,711
1	12	\$221,711	\$1,416	\$1,201	\$ 214.90	\$221,496
2	13	\$221,496	\$1,416	\$1,200	\$ 216.06	\$221,280

Note the fixed payment and variable Interest and Amortization. In effect, the PMT is calculated and the AMORT is solved for by backing out the earned INTerest for that period.

Assuming the borrower sells the house at the end of the first year, the required PMT would be the Prin EOP from the prior year, as well as the INT AND AMORT for that year.

Table 4 (a) presents a loan amortization schedule for a FRM. As noted, the P-EOP is paid off at an accelerating rate (see: AMORT increasing) and, at the end of the amortization period, is eliminated. In this case, the INT payments over time are a return “on” the loan, and the AMORT payments are a return “of” the loan.

In Excel, the return to the lender on the FRM is the IRR or rate of return in which the Present Value (PV) of the amount borrowed (Pi) is equal to the PV of the benefits or PMTs. As noted in Table 4 (a), if the numbers are calculated correctly, the monthly IRR equals the initial Mortgage Interest Rate (6.5%). Mechanically, this is calculated by laying out the monthly payments in a column where the term is $t * N$ and the vector of outlays begins with the negative Pi and continues through the PMT for the respective period, laid out on a monthly basis. Once the IRR is calculated using Excel’s built-in function, the annual equivalence can be calculated by multiplying it by 12 months.

In the case of the annual IRR, the monthly payments can be aggregated into annual totals, and the beginning and end of the year values can be established. Using this vector which starts with the negative value of the Pi, the return can be generated by the same IRR function. As expected, the IRR for annual payments is less than monthly payments, since the payments are made at the end of the period and the lender will have to wait a bit longer to collect payments.

FRM Yields

Table 4 (a): FRM Yield to Lender, Full Amortization, No Points

Year	PMT	INT	AMORT	P-EOP
	(\$224,000)			
1	\$16,990	\$14,486	\$2,504	\$221,496
2	\$16,990	\$14,319	\$2,671	\$218,825
3	\$16,990	\$14,140	\$2,850	\$215,975
4	\$16,990	\$13,949	\$3,041	\$212,933
5	\$16,990	\$13,745	\$3,245	\$209,689
6	\$16,990	\$13,528	\$3,462	\$206,226
7	\$16,990	\$13,296	\$3,694	\$202,532
8	\$16,990	\$13,049	\$3,941	\$198,591
9	\$16,990	\$12,785	\$4,205	\$194,386
10	\$16,990	\$12,503	\$4,487	\$189,899
11	\$16,990	\$12,202	\$4,788	\$185,111
12	\$16,990	\$11,882	\$5,108	\$180,003
13	\$16,990	\$11,540	\$5,450	\$174,553
14	\$16,990	\$11,175	\$5,815	\$168,737
15	\$16,990	\$10,785	\$6,205	\$162,532
16	\$16,990	\$10,370	\$6,620	\$155,912
17	\$16,990	\$9,926	\$7,064	\$148,849
18	\$16,990	\$9,453	\$7,537	\$141,312
19	\$16,990	\$8,948	\$8,041	\$133,270
20	\$16,990	\$8,410	\$8,580	\$124,690
21	\$16,990	\$7,835	\$9,155	\$115,536
22	\$16,990	\$7,222	\$9,768	\$105,768
23	\$16,990	\$6,568	\$10,422	\$95,346
24	\$16,990	\$5,870	\$11,120	\$84,226
25	\$16,990	\$5,125	\$11,865	\$72,361
26	\$16,990	\$4,331	\$12,659	\$59,702
27	\$16,990	\$3,483	\$13,507	\$46,195
28	\$16,990	\$2,578	\$14,412	\$31,783
29	\$16,990	\$1,613	\$15,377	\$16,407
30	\$16,990	\$583	\$16,407	\$0
IRR Calculations				
Annual	6.41%	APR	6.38%	
Monthly	6.50%	APR	6.50%	

This table shows the amortization schedule for the \$224,000 mortgage, with the declining INTERest over time based on the accelerating AMORTization which reduces the balance to \$0 at the end of the amortization period.

The schedule “draws from” the detailed monthly schedule to provide the precision necessary to get back to the 6.5% interest rate. In this model, the Year 1 is the sum of Month 1-12, Year 2 is Month 13-24, etc.

If the model is set up correctly, the loan is fully repaid at the end of the term.

Note the Annual IRR is lower than the Monthly which is expected since the PMTs are made at the end of the period. Thus, for the 1st year, the last month is discounted back 12 months, the 2nd last back 11 months, etc. On the other hand, if the payments are annual, the entire first year payment is discounted back 12 months, thus lowering the relative present value.

The IRR annual is based on the vector of cash flows above, while the monthly is based on the monthly cash flows which have been consolidated into the annual ones. The monthly IRR must be multiplied by 12 to get the annual equivalent. The APR is calculated by MROUND(actual IRR, .00125) to convert it to the nearest 1/8 of a percent as is the industry norm. Table 4 (b) shows the payments and APR with no up-front financing fees and a 10 year hold. As might be expected, the yields are the same regardless of the time

frame for repayment. This is one of the axioms of Time Value of Money calculations used in mortgage finance.

Table 4 (b): FRM Yields; No Points and 10 year Hold

Year	PMT	INT	AMORT	P-EOP
	(\$224,000)			
1	\$16,990	\$14,486	\$2,504	\$221,496
2	\$16,990	\$14,319	\$2,671	\$218,825
3	\$16,990	\$14,140	\$2,850	\$215,975
4	\$16,990	\$13,949	\$3,041	\$212,933
5	\$16,990	\$13,745	\$3,245	\$209,689
6	\$16,990	\$13,528	\$3,462	\$206,226
7	\$16,990	\$13,296	\$3,694	\$202,532
8	\$16,990	\$13,049	\$3,941	\$198,591
9	\$16,990	\$12,785	\$4,205	\$194,386
10	\$206,889	\$12,503	\$194,386	\$0
11	\$0	\$0	\$0	\$0
12	\$0	\$0	\$0	\$0

Note: this is without Origination Fee or Discount Point. The APR doesn't change since the borrower received all the proceeds at closing.

As above, annual sums are aggregated from the monthly data.

IRR Calculations			
Annual	6.45%	APR	6.50%
Monthly	6.50%	APR	6.50%

Under federal disclosure standards, the APR should include Origination Fees, Points and other eligible charges which create a net deduction from the actual mortgage proceeds dispersed at the closing. these charges have the effect of reducing the actual cash proceeds received by the borrower at the closing, but do not reduce the periodic payment. As such, the yield to the lender, and thus "cost" to the borrower increases. There is some relief for the borrower in the sense that some of these costs can be expensed in the year they are incurred, reducing the after tax cost of the loan. The same is true with interest costs, although the levels of write-offs are subject to IRS rulings.

As noted in Table 4(c), the initial loan is \$217,280 which is the Pi of \$224,000 less the 1% Origination Fee and the 2% in Points. In this case, the IRR and APR actually increases, since the initial proceeds at the beginning of the loan are reduced by these charges. Even though the borrower receives less at the loan closing, the monthly PMT is calculated as though the full amount of the loan was dispersed up front. Thus, the borrower is paying 6.5% on more than actually received which translates to a higher cost of capital.

Table 4(c): FRM Yields, Points and 10 year Hold

Year	PMT	INT	AMORT	P-EOP
	(\$217,280)			
1	\$16,990	\$14,486	\$2,504	\$221,496
2	\$16,990	\$14,319	\$2,671	\$218,825
3	\$16,990	\$14,140	\$2,850	\$215,975
4	\$16,990	\$13,949	\$3,041	\$212,933
5	\$16,990	\$13,745	\$3,245	\$209,689
6	\$16,990	\$13,528	\$3,462	\$206,226
7	\$16,990	\$13,296	\$3,694	\$202,532
8	\$16,990	\$13,049	\$3,941	\$198,591
9	\$16,990	\$12,785	\$4,205	\$194,386
10	\$206,889	\$12,503	\$194,386	\$0
11	\$0	\$0	\$0	\$0

Note how the APR increases due to the points. In this case,

$$\$217,280 = \$224,000 * (1 - 1\% - 2\%)$$

IRR Calculations			
Annual	6.90%	APR	6.88%
Monthly	6.94%	APR	7.00%

In Table 4 (d), if the Prepayment Penalty of 2% is factored into the 10 year hold, the IRR and APR change to: Note the APR here is a misnomer; in reality, the Prepayment Penalty is not reported in the APR since it is not know up front if or when it will be exercised. Thus, this is something of a “look-back” APR.

Table 4 (d): FRM Yields, Points, Prepayment Penalty, 10 Year Hold

Year	PMT	INT	AMORT	P-EOP
	(\$217,280)			
1	\$16,990	\$14,486	\$2,504	\$221,496
2	\$16,990	\$14,319	\$2,671	\$218,825
3	\$16,990	\$14,140	\$2,850	\$215,975
4	\$16,990	\$13,949	\$3,041	\$212,933
5	\$16,990	\$13,745	\$3,245	\$209,689
6	\$16,990	\$13,528	\$3,462	\$206,226
7	\$16,990	\$13,296	\$3,694	\$202,532
8	\$16,990	\$13,049	\$3,941	\$198,591
9	\$16,990	\$12,785	\$4,205	\$194,386
10	\$210,694	\$12,503	\$194,386	\$0
11	\$0	\$0	\$0	\$0

IRR Calculations			
Annual	7.04%	APR	7.00%
Monthly	7.07%	APR	7.13%

Table 4 (e): FRM Yields, Points, Prepayment Penalty and 5 Year Hold

Year	PMT	INT	AMORT	P-EOP
	(\$217,280)			
1	\$16,990	\$14,486	\$2,504	\$221,496
2	\$16,990	\$14,319	\$2,671	\$218,825
3	\$16,990	\$14,140	\$2,850	\$215,975
4	\$16,990	\$13,949	\$3,041	\$212,933
5	\$230,878	\$13,745	\$212,933	\$0
6	\$0	\$0	\$0	\$0
7	\$0	\$0	\$0	\$0

In this case, the \$230,878 in the 5th years includes a 2% Prepayment Penalty. Note the increase in IRR yield to the lender and the APR.

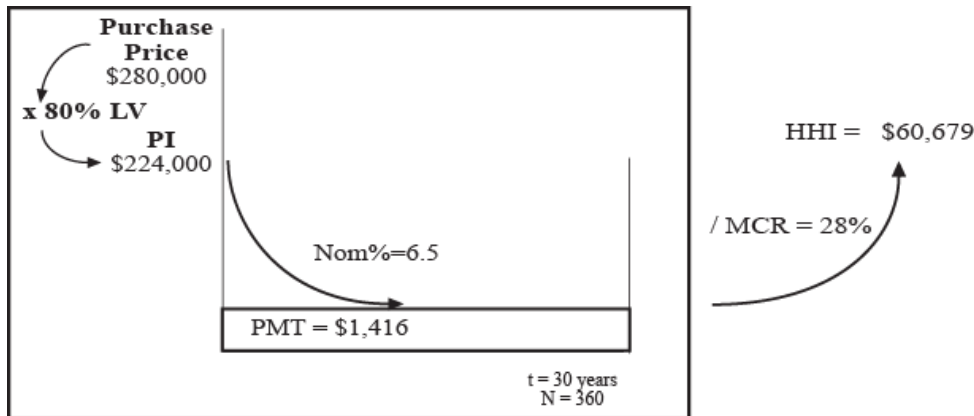
IRR Calculations			
Annual	7.55%	APR	7.50%
Monthly	7.56%	APR	7.50%

Note: the APR is 100 basis points (bp) or 1% above the contract rate.

Once the mortgage Payment (PMT) schedule is established, the Mortgage Capture Ratio (MCR) can be applied to calculate the Household Income Required (HHIr) to “afford” the house. Assuming the borrower can come up with the \$56,000 downpayment, the HHIr is \$60,679/year. This calculation is based on the formula:

$$\text{HHIr} = (\text{PMT} / \text{MCR}) * 12$$

Exhibit 6: Household Income Required (HHIr)



In this case, the borrower would need an annual Household Income of \$60,679 to qualify for the \$224,000 loan. The borrower would have to come up with downpayment or equity investment which is the \$56,000 gap between the Purchase Price and the mortgage. In addition, the borrower may need to come up with more equity at the closing to cover and Origination Fees or Discount Points, as well as escrows or pro rata payments (e.g., property taxes may have been paid in advance).

Once the basic mechanics of the FRM are understood, then a series of higher order questions can be explored. For example, if the borrower’s HHI was only \$55,000, what could they afford to pay for a house?

$$\begin{aligned} \text{Mortgage Max} &= (\text{HHI}/\text{mo} * \text{MCR}) / \text{Mc} \\ &= (\$55,000/12) * 28\% / .006321 \\ &= \$203,037 \end{aligned}$$

Where:

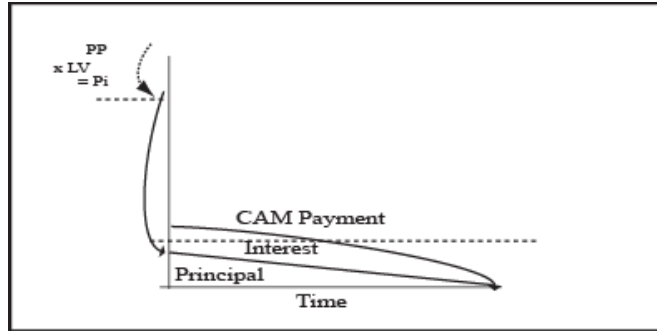
- Mc = Mortgage Coefficient to AMORT \$1
= $-\text{PMT}(\text{Mi}/12, t * N, \$1)$
= 0.006321
- Mi = Mortgage Interest Rate
- t* N = Amortization Period * Periodicity
- \$1 = Present Value of \$1

In this case, the borrower would be short \$26,203 which could be covered by additional equity, paying less, lowering the interest rate, or some “creative financing” to reduce front-end requirement.

Constant Amortization Mortgages (CAM)

Overview

One of the first amortizing mortgages was the “Constant Amortization Mortgage” or CAM. This mortgage was a welcome innovation from the high down payment mortgages that proceeded in the early years of residential mortgage finance. Rather than relying on a low Loan-to-Value (LV) loans in which the borrower has significant equity investment and thus a higher “will to pay” to manage risk, the CAM recognized that the lender could reduce risk by ensuring the borrower’s motivations to stick with the loan would grow over time as equity buildup increases (i.e., the loan is amortized). Since interest is only due on the outstanding balance, the interest payments decline over time causing a compensating decline in total payments (i.e., total payments = interest plus amortization).



CAM Base Case

To allow you to better compare and contrast mortgages, each of the cases use the same core assumptions, adding unique or idiosyncratic items where appropriate. Given the parallels between the TFRM and the CAM, the core assumptions are the same; the differences reside in how the periodic payments are structured.

Table 5: CAM Base Case Assumptions

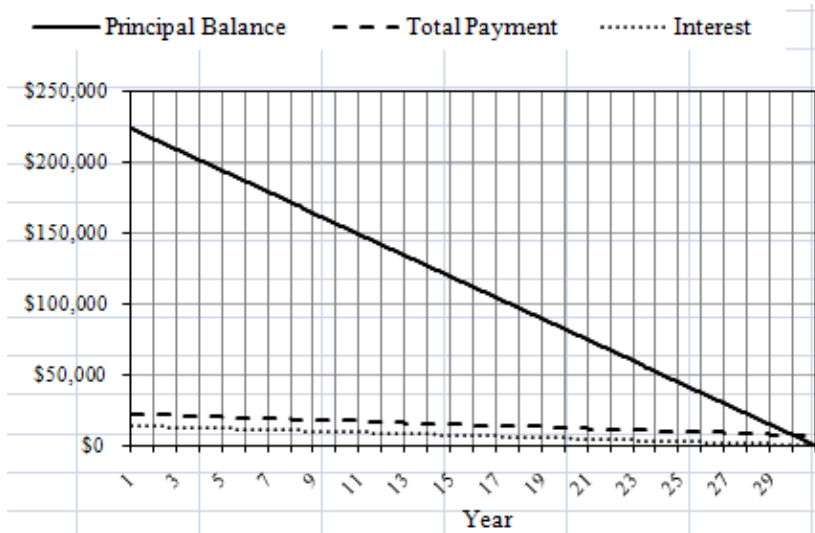
Mortgage Assumptions	Value	Code
Purchase Price	\$ 280,000	PP
Mortgage Terms		
Loan-to-Value	80%	LV
Rate	6.50%	Mi
Term	30	t
Periodicity	12	N
Mortgage Fees		
Origination Fee	1%	FeeO
Points	2%	Pts
Prepayment Penalty	2%	PP
Equity Capital		
Mortgage Capture Ratio	28%	MCR
Expected Holding Period	5	E(HP)
Cost of Capital	10%	Ec

Sources of Capital	Value	Code
Initial Principal	\$ 224,000	Pi
Initial Equity	\$ 56,000	Ei
Total Capital	\$ 280,000	Tcap

As with the Traditional Fixed Rate Mortgage, the analysis of the CAM will indicate various options including whether or not the points, fees and penalties are included in the IRR/APR, as well as the holding period.

CAM Visualization: Cash Flows and Principal Balances

Exhibit 6: CAM Visualization



As noted, the amortization stays constant which generates the straight downward slope in the Principal and the End of Period (Prin EOP).

CAM Mechanics

Table 6: CAM Mechanics

Year	Mo	Prin BOP	PMT	INT	AMORT	Prin EOP
			(\$224,000)			\$224,000
1	1	\$224,000	\$ 1,836	\$ 1,213	\$ 622	\$223,378
1	2	\$223,378	\$ 1,832	\$ 1,210	\$ 622	\$222,756
1	3	\$222,756	\$ 1,829	\$ 1,207	\$ 622	\$222,133
1	4	\$222,133	\$ 1,825	\$ 1,203	\$ 622	\$221,511
1	5	\$221,511	\$ 1,822	\$ 1,200	\$ 622	\$220,889
1	6	\$220,889	\$ 1,819	\$ 1,196	\$ 622	\$220,267
1	7	\$220,267	\$ 1,815	\$ 1,193	\$ 622	\$219,644
1	8	\$219,644	\$ 1,812	\$ 1,190	\$ 622	\$219,022
1	9	\$219,022	\$ 1,809	\$ 1,186	\$ 622	\$218,400
1	10	\$218,400	\$ 1,805	\$ 1,183	\$ 622	\$217,778
1	11	\$217,778	\$ 1,802	\$ 1,180	\$ 622	\$217,156
1	12	\$217,156	\$ 1,798	\$ 1,176	\$ 622	\$216,533
2	13	\$216,533	\$ 1,795	\$ 1,173	\$ 622	\$215,911

Note, the PMT changes due to the decline in interest rate. Interest is only paid on the Principal outstanding at the beginning of each period (Prin BOP)

CAM Yields

Table 7 (a): CAM Yields to Lender, Full Term

Year	PMT	INT	AMORT	P-EOP
	(\$224,000)			
1	\$21,804	\$14,338	\$7,467	\$216,533
2	\$21,319	\$13,852	\$7,467	\$209,067
3	\$20,834	\$13,367	\$7,467	\$201,600
4	\$20,348	\$12,882	\$7,467	\$194,133
5	\$19,863	\$12,396	\$7,467	\$186,667
6	\$19,378	\$11,911	\$7,467	\$179,200
7	\$18,892	\$11,426	\$7,467	\$171,733
8	\$18,407	\$10,940	\$7,467	\$164,267
9	\$17,922	\$10,455	\$7,467	\$156,800
10	\$17,436	\$9,970	\$7,467	\$149,333
11	\$16,951	\$9,484	\$7,467	\$141,867
12	\$16,466	\$8,999	\$7,467	\$134,400
13	\$15,980	\$8,514	\$7,467	\$126,933
14	\$15,495	\$8,028	\$7,467	\$119,467
15	\$15,010	\$7,543	\$7,467	\$112,000
16	\$14,524	\$7,058	\$7,467	\$104,533
17	\$14,039	\$6,572	\$7,467	\$97,067
18	\$13,554	\$6,087	\$7,467	\$89,600
19	\$13,068	\$5,602	\$7,467	\$82,133
20	\$12,583	\$5,116	\$7,467	\$74,667
21	\$12,098	\$4,631	\$7,467	\$67,200
22	\$11,612	\$4,146	\$7,467	\$59,733
23	\$11,127	\$3,660	\$7,467	\$52,267
24	\$10,642	\$3,175	\$7,467	\$44,800
25	\$10,156	\$2,690	\$7,467	\$37,333
26	\$9,671	\$2,204	\$7,467	\$29,867
27	\$9,186	\$1,719	\$7,467	\$22,400
28	\$8,700	\$1,234	\$7,467	\$14,933
29	\$8,215	\$748	\$7,467	\$7,467
30	\$7,730	\$263	\$7,467	\$0
IRR Calculations				
Annual	6.35%			
Monthly	6.50%			

The CAM yields or IRR to the Lender are based on the same setup as the Fixed Rate Mortgage.

As noted, the monthly IRR = the contract interest rate, ignoring Points and Prepayment Charges.

Table 7 (b): CAM Yields, 10 Year Hold with Points, no Prepayment

Year	PMT	INT	AMORT	P-EOP
	(\$217,280)			
1	\$21,804	\$14,338	\$7,467	\$216,533
2	\$21,319	\$13,852	\$7,467	\$209,067
3	\$20,834	\$13,367	\$7,467	\$201,600
4	\$20,348	\$12,882	\$7,467	\$194,133
5	\$19,863	\$12,396	\$7,467	\$186,667
6	\$19,378	\$11,911	\$7,467	\$179,200
7	\$18,892	\$11,426	\$7,467	\$171,733
8	\$18,407	\$10,940	\$7,467	\$164,267
9	\$17,922	\$10,455	\$7,467	\$156,800
10	\$166,770	\$9,970	\$156,800	\$0

As indicated, with a 10 year hold the amortization payments stay constant through the hold period, and the residual is paid in a lump in the last year. Note that it is at the end of the year (i.e., 12th month) and therefore must be treated as such in the monthly schedule. This schedule combines the 12 months for each year.

IRR Calculations			
Annual	6.87%	APR	6.88%
Monthly	6.99%	APR	7.00%

The IRR and APR are related, but the APR uses the MROUND (IRR,.00125) function to get to the standard quote within the nearest 1/8th percent.

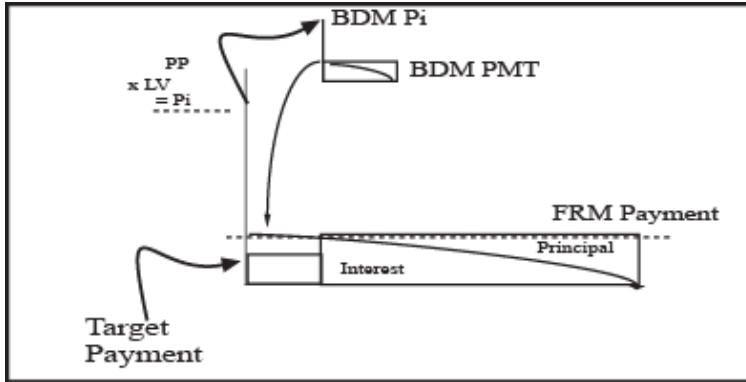
Table 7 (c): CAM Yields; Points, Prepayment and 5 year Hold

Year	PMT	INT	AMORT	P-EOP
	(\$217,280)			
1	\$21,804	\$14,338	\$7,467	\$216,533
2	\$21,319	\$13,852	\$7,467	\$209,067
3	\$20,834	\$13,367	\$7,467	\$201,600
4	\$20,348	\$12,882	\$7,467	\$194,133
5	\$210,275	\$12,396	\$194,133	(\$0)
IRR Calculations				\$0
Annual	7.49%	APR	7.50%	--
Monthly	7.58%	APR	7.63%	

Again, the APR would not formally include the Prepayment, although it does affect the actual paid rate. Note here how the yields are 1.08% above the contract due to short term and high penalties.

At this point, it's good to reflect on the differences between the FRM and the CAM; which will have higher APRs with the fees and penalties considered? As might be expected, since the CAM has higher initial payments, the affects of these costs and a shorter recapture period will result in slightly higher rates (see: Tables 4 (e) and 7 (c)).

Buydown Mortgages (BDM)



Overview

In a Buydown Mortgage, the seller --in many cases a homebuilder-- agrees to set aside a portion of the purchase price in a special mortgage account for the benefit of the buyer. This account, which earns a moderate rate of interest, is drawn down over a relatively brief period of time. As such, the proceeds from this account generate a fairly deep front-end subsidy. The lender receives

fixed payments over the life of the loan, but a portion of the initial payments are drawn from the BDM account. When the BDM is liquidated, the payments jump back up to the contract rate. The typical case in which a builder would use a BDM consists of the situation in which speculative housing has been built for a certain tight market. While this speculative housing might have been marketable at the time the development project began, by the time some of the houses are ready to be sold, the market has turned and they are not marketable. The decline in marketability stems, not from rejection of the project, but rather from changes in interest rates that have raised the qualifying income to a level that effectively prevents the target market from raising the capital necessary to pay the asking price. To offset this phenomenon, the builder might offer a BDM to increase the potential price at which a property can be sold in the current market.

BDM Base Case

Table 8 (a): BDM Base Case

Traditional Mortgage		Code
Purchase Price	\$ 280,000	PP
Mortgage Terms		
Loan-to-Value	80%	LV
Rate	6.50%	Mi
Term	30	t
Periodicity	12	N
Mortgage Fees		
Origination Fee	1%	FeeO
Points	2%	Pts
Prepayment Penalty	2%	PP
Equity Capital		
Mortgage Capture Ratio	28%	MCR
Expected Holding Period	10	E(HP)
Cost of Capital	10%	Ec

Table 8 (b): Buydown Capital Structure

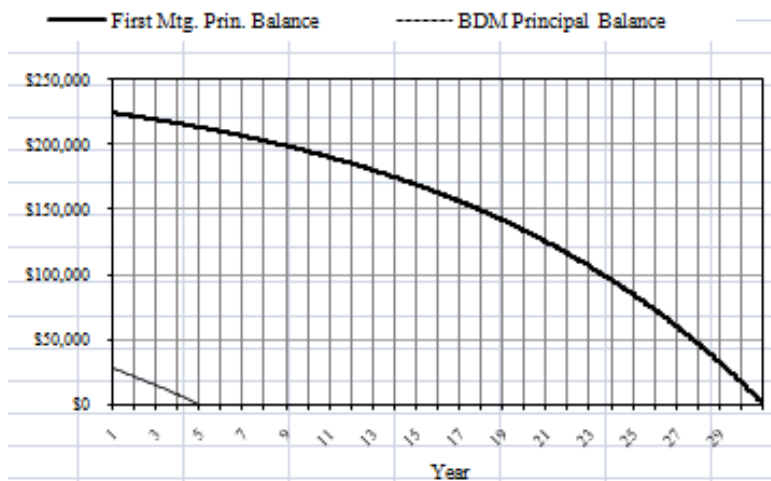
Sources of Capital			Code
Initial Principal	\$ 224,000		Pi
Initial Equity	\$ 56,000		Ei
Total Capital	\$ 280,000		Tcap

Builder Buydown Account	Buydown % of Price	10%
	Buydown Rate	5%
	Term	4
	Periodicity	12
	Buydown Fee	2%
	Buydown Amount: Calculated	\$ 28,000

As noted in Table 8 (b), the Builder’s Buydown Account is funded out of the sales proceeds. That is, the seller/builder sets aside 10% of the Gross Sales Price (in this case, the Purchase Price (PP)) of the house which is \$280,000. This account earns interest at 5% and is drawn down or liquidated over 4 years. As such, the analysis involves the amortization of two separate --but linked-- mortgages: the traditional FRM; and, the Buydown Mortgage. Even though the BDM earns at a lower rate than the FRM, the account provides a significant subsidy since it is amortized or extracted over a short period of time.

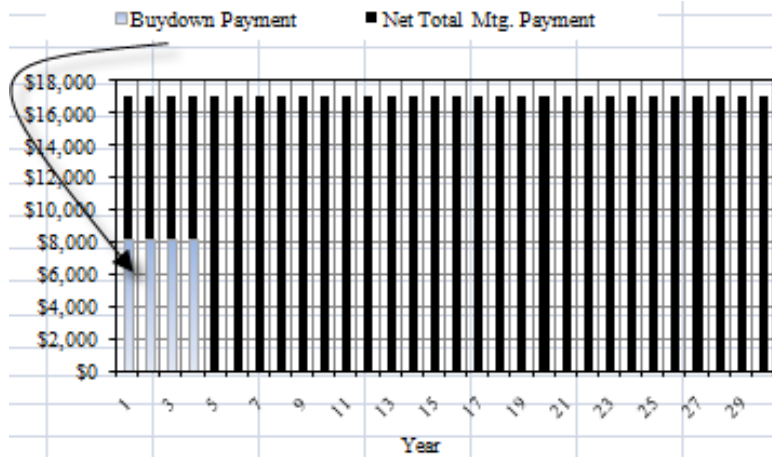
BDM Visualization: Cash Flows and Principal Balances

Exhibit 7(a): BDM Principal Balances



Note the amortization on the First Mortgage echoes the FRM since it is at the same terms. The only difference is the buyer’s initial payments are offset by the BDM which liquidates in 4 years.

Exhibit 7 (b): Cash Flow Visualization



As noted, the Net Payment for the buyer is significantly reduced in the first 4 years or the term of the BDM account. It then jumps up to the total gross payment. Throughout, the arrangement, the PMT remains the same as in the FRM.

BDM Mechanics

Table 9: BDM Mechanics

Year	Mo	Prin BOP	PMT	INT	AMORT	Prin EOP	BDM BOP	BDM PM	BDM INT	B-AMORT	B-EOP	Net PMT
			(\$224,000)			\$224,000						\$ (224,000)
1	1	\$224,000	\$1,416	\$1,213	\$ 202.50	\$223,798	\$28,000	\$645	\$117	\$568	\$27,472	\$771
1	2	\$223,798	\$1,416	\$1,212	\$ 203.60	\$223,594	\$27,472	\$645	\$114	\$530	\$26,941	\$771
1	3	\$223,594	\$1,416	\$1,208	\$ 208.04	\$222,768	\$25,337	\$645	\$108	\$537	\$25,337	\$771
1	4	\$223,389	\$1,416	\$1,208	\$ 208.04	\$222,768	\$25,337	\$645	\$108	\$537	\$25,337	\$771
1	5	\$223,183	\$1,416	\$1,207	\$ 209.17	\$222,559	\$24,798	\$645	\$103	\$541	\$24,256	\$771
1	6	\$222,976	\$1,416	\$1,206	\$ 210.30	\$222,349	\$24,256	\$645	\$101	\$544	\$23,713	\$771
1	7	\$222,768	\$1,416	\$1,204	\$ 211.44	\$222,138	\$23,713	\$645	\$99	\$546	\$23,167	\$771
1	8	\$222,559	\$1,416	\$1,203	\$ 212.59	\$221,925	\$23,167	\$645	\$97	\$548	\$22,618	\$771
1	9	\$222,349	\$1,416	\$1,202	\$ 213.74	\$221,711	\$22,618	\$645	\$94	\$551	\$22,068	\$771
1	10	\$222,138	\$1,416	\$1,201	\$ 214.90	\$221,496	\$22,068	\$645	\$92	\$553	\$21,515	\$771
1	11	\$221,925	\$1,416	\$1,200	\$ 216.06	\$221,280	\$21,515	\$645	\$90	\$555	\$20,960	\$771
1	12	\$221,711	\$1,416	\$1,199	\$ 217.23	\$221,063	\$20,960	\$645	\$87	\$557	\$20,402	\$771
2	13	\$221,496	\$1,416	\$1,197	\$ 218.41	\$220,845	\$20,402	\$645	\$85	\$560	\$19,842	\$771
2	14	\$221,280	\$1,416	\$1,196	\$ 219.59	\$220,625	\$19,842	\$645	\$83	\$562	\$19,280	\$771
2	15	\$221,063	\$1,416	\$1,195	\$ 220.78	\$220,404	\$19,280	\$645	\$80	\$564	\$18,716	\$771
2	16	\$220,845	\$1,416	\$1,194	\$ 221.98	\$220,182	\$18,716	\$645	\$78	\$567	\$18,149	\$771
2	17	\$220,625	\$1,416	\$1,156	\$ 259.62	\$213,194	\$1,282	\$645	\$5	\$639	\$642	\$771
2	18	\$220,404	\$1,416	\$1,155	\$ 261.03	\$212,933	\$642	\$645	\$3	\$642	\$0	\$771
5	47	\$213,454	\$1,416	\$1,153	\$ 262.44	\$212,671	\$0	\$0	\$0	\$0	\$0	\$1,416
5	48	\$213,194	\$1,416	\$1,152	\$ 263.86	\$212,407	\$0	\$0	\$0	\$0	\$0	\$1,416
5	49	\$212,933	\$1,416	\$1,151	\$ 265.29	\$212,142	\$0	\$0	\$0	\$0	\$0	\$1,416
5	50	\$212,671	\$1,416									
5	51	\$212,407	\$1,416									

As noted in Table 9, at the end of the BDM period (in this case 4 years) the BDM subsidy goes away and the buyer must make the full payments which are the same as the FRM of \$1,416/month.

BDM Yields

Table 10 (a): Annualized BDM Yields; Full Term, No Points

Year	T-PMT	T-EOP	B-PMT	B-INT	B-AMORT	B-EOP	NET PAY
	\$ (224,000)						
1	\$16,990	\$221,496	\$7,738	\$1,253	\$6,485	\$21,515	\$9,252
2	\$16,990	\$218,825	\$7,738	\$921	\$6,817	\$14,698	\$9,252
3	\$16,990	\$215,975	\$7,738	\$572	\$7,166	\$7,532	\$9,252
4	\$16,990	\$212,933	\$7,738	\$206	\$7,532	\$0	\$9,252
5	\$16,990	\$209,689	\$0	\$0	\$0	\$0	\$16,990
6	\$16,990	\$206,226	\$0	\$0	\$0	\$0	\$16,990
7	\$16,990	\$202,532	\$0	\$0	\$0	\$0	\$16,990
8	\$16,990	\$198,591	\$0	\$0	\$0	\$0	\$16,990
9	\$16,990	\$194,386	\$0	\$0	\$0	\$0	\$16,990
10	\$16,990	\$189,899	\$0	\$0	\$0	\$0	\$16,990
11	\$16,990	\$185,111	\$0	\$0	\$0	\$0	\$16,990
12	\$16,990	\$180,003	\$0	\$0	\$0	\$0	\$16,990
13	\$16,990	\$174,553	\$0	\$0	\$0	\$0	\$16,990
14	\$16,990	\$168,737	\$0	\$0	\$0	\$0	\$16,990
15	\$16,990	\$162,532	\$0	\$0	\$0	\$0	\$16,990
16	\$16,990	\$155,912	\$0	\$0	\$0	\$0	\$16,990
17	\$16,990	\$148,849	\$0	\$0	\$0	\$0	\$16,990
18	\$16,990	\$141,312	\$0	\$0	\$0	\$0	\$16,990
19	\$16,990	\$133,270	\$0	\$0	\$0	\$0	\$16,990
20	\$16,990	\$124,690	\$0	\$0	\$0	\$0	\$16,990
21	\$16,990	\$115,536	\$0	\$0	\$0	\$0	\$16,990
22	\$16,990	\$105,768	\$0	\$0	\$0	\$0	\$16,990
23	\$16,990	\$95,346	\$0	\$0	\$0	\$0	\$16,990
24	\$16,990	\$84,226	\$0	\$0	\$0	\$0	\$16,990
25	\$16,990	\$72,361	\$0	\$0	\$0	\$0	\$16,990
26	\$16,990	\$59,702	\$0	\$0	\$0	\$0	\$16,990
27	\$16,990	\$46,195	\$0	\$0	\$0	\$0	\$16,990
28	\$16,990	\$31,783	\$0	\$0	\$0	\$0	\$16,990
29	\$16,990	\$16,407	\$0	\$0	\$0	\$0	\$16,990
30	\$16,990	\$0	\$0	\$0	\$0	\$0	\$16,990
IRR Calculations							
Annual	6.41%						
Monthly	6.50%						

This schedule shows the payment pattern for the first mortgage which is a FRM, and the subsidized payment that must come from the buyer. As noted, the BDM subsidy is deep, allowing households with lower incomes than the FRM would support. Due to the TVM if the model is set up correctly, the IRR

will equal the interest rate which, in this case is 6.5% monthly, on an annualized basis. This “yield” or earned rate will differ if the lender charges points, fees or penalties.

Table 10 (b): presents the annualized schedule of mortgage cash flows when the upfront Commitment Fee and Discount are factored into the analysis. As with the other mortgages, these charges have the effect of reducing the actual cash proceeds received by the borrower at the closing, but do not reduce the periodic payment. As such, the yield to the lender, and thus “cost” to the borrower increases. There is some relief for the borrower in the sense that some of these costs can be expensed in the year they are incurred, reducing the after tax cost of the loan. The same is true with interest costs, although the level of tax shelter benefits is subject to IRS rulings.

Table 10 (b): BDM Returns, Points, No Prepayment Penalty, 10 Year Hold

Year	T-PMT	T-EOP	B-PMT	B-INT	B-AMORT	B-EOP	NET PAY
	\$ (217,280)						
1	\$16,990	\$221,496	\$7,738	\$1,253	\$6,485	\$21,515	\$9,252
2	\$16,990	\$218,825	\$7,738	\$921	\$6,817	\$14,698	\$9,252
3	\$16,990	\$215,975	\$7,738	\$572	\$7,166	\$7,532	\$9,252
4	\$16,990	\$212,933	\$7,738	\$206	\$7,532	\$0	\$9,252
5	\$16,990	\$209,689	\$0	\$0	\$0	\$0	\$16,990
6	\$16,990	\$206,226	\$0	\$0	\$0	\$0	\$16,990
7	\$16,990	\$202,532	\$0	\$0	\$0	\$0	\$16,990
8	\$16,990	\$198,591	\$0	\$0	\$0	\$0	\$16,990
9	\$16,990	\$194,386	\$0	\$0	\$0	\$0	\$16,990
10	\$206,889	\$0	\$0	\$0	\$0	\$0	\$206,889
11	\$0	\$0	\$0	\$0	\$0	\$0	\$0

As noted, when the Origination costs are calculated, the IRR spread over the mortgage rate accelerates.

IRR Calculations	
Annual	6.90%
Monthly	6.94%

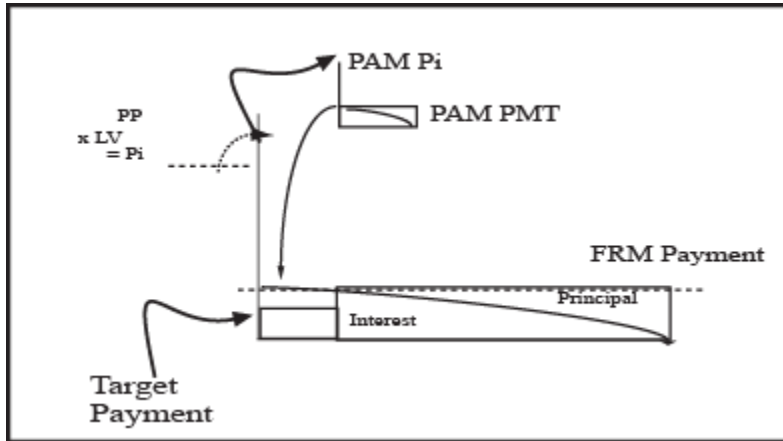
Table 10 (c): BDM Returns; Points and Prepayment Penalty, 10 yr hold

Year	T-PMT	T-EOP	B-PMT	B-INT	B-AMORT	B-EOP	NET PAY
	\$ (217,280)						
1	\$16,990	\$221,496	\$7,738	\$1,253	\$6,485	\$21,515	\$9,252
2	\$16,990	\$218,825	\$7,738	\$921	\$6,817	\$14,698	\$9,252
3	\$16,990	\$215,975	\$7,738	\$572	\$7,166	\$7,532	\$9,252
4	\$16,990	\$212,933	\$7,738	\$206	\$7,532	\$0	\$9,252
5	\$16,990	\$209,689	\$0	\$0	\$0	\$0	\$16,990
6	\$16,990	\$206,226	\$0	\$0	\$0	\$0	\$16,990
7	\$16,990	\$202,532	\$0	\$0	\$0	\$0	\$16,990
8	\$16,990	\$198,591	\$0	\$0	\$0	\$0	\$16,990
9	\$16,990	\$194,386	\$0	\$0	\$0	\$0	\$16,990
10	\$210,694	\$0	\$0	\$0	\$0	\$0	\$210,694
11	\$0	\$0	\$0	\$0	\$0	\$0	\$0

In comparing this to Table 6 (b), the difference is the 10th year Total Payment. In this case, the 2% penalty is added, thus increasing the yield. Again, in a technical sense, this wouldn’t be in the APR, but it affects the costs.

IRR Calculations	
Annual	7.04%
Monthly	7.07%

Pledged Account Mortgages (PAM)



Overview

In a Pledged Account Mortgage, the lender agrees to apply a higher LV ratio over the typical ceiling for a conventional mortgage. The excess proceeds are used to set up as a separate account (i.e., the PAM) which earns a moderate rate of interest. The balance of this account is drawn down over a relatively short period of time and the proceeds are used to lower or subsidize the initial mortgage

payments. During the life of the loan, the lender receives a gross payment equal the level needed to amortize the loan while during the term of the PAM, the borrower's payment is reduced by the PAM draw. Once the PAM account is liquidated, the borrower's payments step up to the full amount necessary to amortize the loan.

PAM Base Case

Traditional Mortgage	Inputs	Code
Purchase Price	\$ 280,000	PP
Mortgage Terms		
Loan-to-Value	80%	LV
Rate	6.50%	Mi
Term	30	t
Periodicity	12	N
Mortgage Fees		
Origination Fee	1%	FeeO
Points	2%	Pts
Prepayment Penalty	2%	PP
Equity Capital		
Mortgage Capture Ratio	28%	MCR
Expected Holding Period	5	E(HP)
Cost of Capital	10%	Ec

Sources of Capital		Code
Initial Principal	\$ 224,000	Pi
Initial Equity	\$ 56,000	Ei
Total Capital	\$ 280,000	Tcap

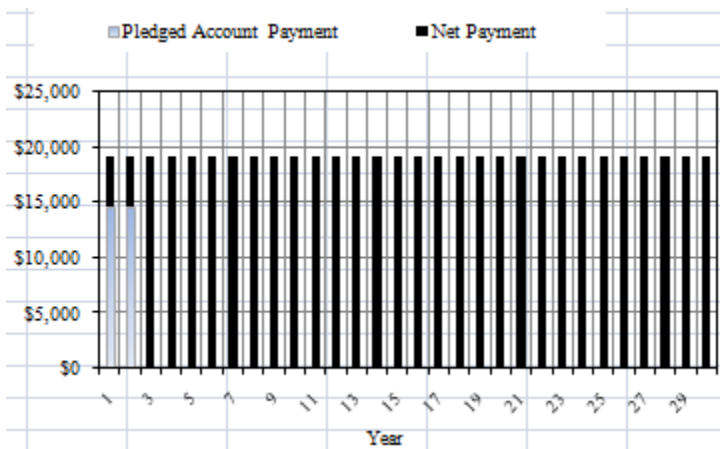
In the PAM, the LV ratio is increased to raise additional capital. In our case, the PAM LV rises to 90% from the 80% TFRM. The excess of the proceeds --\$28,000-- is placed in the PAM account. In effect, the borrower is purchasing and funding an annuity which earns a moderate rate of interest (4%) and is drawn down over a relatively short period of time. This is similar to the BDM, although rather than the building funding the account, the borrower is self-funding by accessing more capital. Using this account to “subsidize” the monthly payments, the borrower can still qualify, although the equity cushion for the lender is much thinner. The lender may charge a separate fee and some other guarantees or collateral to secure the PAM loan.

Table 11 (b): PAM Capital Structure

Pledged Account Mortgage	
PAM LV	90%
PAM Rate	4%
Term	2
Periodicity	12
PAM Fee	2%
PAM Amount: Calculated	\$ 28,000
Financial Structure (Calculated)	
Traditional First Mortgage	\$ 224,000
PAM	\$ 28,000
Equity	\$ 28,000
Total Capital	\$ 280,000

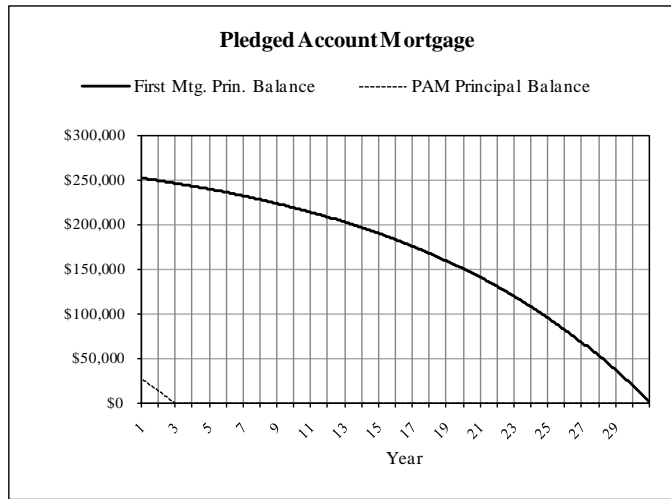
PAM Visualization: Cash Flows and Principal Balances

Exhibit 8 (a): PAM Cash Flows



As in the BDM, the payments to the first mortgage remain fixed, with the borrower’s early payments subsidized by the account.

Exhibit 8 (b): PAM Principal Balances



The underlying FRM is fully amortizing over the amortization period.

Note: this was a 2 year PAM

PAM Mechanics

Year	Mo	T-BOP	T-PMT	T-INT	T-AMORT	T-EOP	PAM BOP	P-PMT	P-INT	P-AMT	P-Pb	Net PMT
			(\$244,440)			\$ 252,000						
1	1	\$252,000	\$1,593	\$1,365	\$ 227.81	\$251,772	\$28,000	\$1,216	\$93	\$1,123	\$26,877	\$377
1	2	\$251,772	\$1,593	\$1,364	\$ 229.05	\$251,543	\$26,877	\$1,216	\$90	\$1,126	\$25,751	\$377
1	3	\$251,543	\$1,593	\$1,363	\$ 230.29	\$251,313	\$25,751	\$1,216	\$86	\$1,130	\$24,621	\$377
1	4	\$251,313	\$1,593	\$1,361	\$ 231.53	\$251,081	\$24,621	\$1,216	\$82	\$1,134	\$23,487	\$377
1	5	\$251,081	\$1,593	\$1,360	\$ 232.79	\$250,849	\$23,487	\$1,216	\$78	\$1,138	\$22,350	\$377
1	6	\$250,849	\$1,593	\$1,359	\$ 234.05	\$250,614	\$22,350	\$1,216	\$74	\$1,141	\$21,208	\$377
1	7	\$250,614	\$1,593	\$1,357	\$ 235.32	\$250,379	\$21,208	\$1,216	\$71	\$1,145	\$20,063	\$377
1	8	\$250,379	\$1,593	\$1,356	\$ 236.59	\$250,143	\$20,063	\$1,216	\$67	\$1,149	\$18,914	\$377
1	9	\$250,143	\$1,593	\$1,355	\$ 237.87	\$249,905	\$18,914	\$1,216	\$63	\$1,153	\$17,761	\$377
1	10	\$249,905	\$1,593	\$1,354	\$ 239.16	\$249,666	\$17,761	\$1,216	\$59	\$1,157	\$16,604	\$377
1	11	\$249,666	\$1,593	\$1,352	\$ 240.46	\$249,425	\$16,604	\$1,216	\$55	\$1,161	\$15,444	\$377
1	12	\$249,425	\$1,593	\$1,351	\$ 241.76	\$249,183	\$15,444	\$1,216	\$51	\$1,164	\$14,279	\$377
2	13	\$249,183	\$1,593	\$1,350	\$ 243.07	\$248,940	\$14,279	\$1,216	\$48	\$1,168	\$13,111	\$377
2	14	\$248,940	\$1,593	\$1,348	\$ 244.38	\$248,696	\$13,111	\$1,216	\$44	\$1,172	\$11,939	\$377
2	15	\$248,696	\$1,593	\$1,347	\$ 245.71	\$248,450	\$11,939	\$1,216	\$40	\$1,176	\$10,763	\$377
2	16	\$248,450	\$1,593	\$1,346	\$ 247.04	\$248,203	\$10,763	\$1,216	\$36	\$1,180	\$9,583	\$377
2	17	\$248,203	\$1,593	\$1,344	\$ 248.38	\$247,955	\$9,583	\$1,216	\$32	\$1,184	\$8,399	\$377
2	18	\$247,955	\$1,593	\$1,343	\$ 249.72	\$247,705	\$8,399	\$1,216	\$28	\$1,188	\$7,211	\$377
2	19	\$247,705	\$1,593	\$1,342	\$ 251.08	\$247,454	\$7,211	\$1,216	\$24	\$1,192	\$6,019	\$377
2	20	\$247,454	\$1,593	\$1,340	\$ 252.44	\$247,202	\$6,019	\$1,216	\$20	\$1,196	\$4,823	\$377
2	21	\$247,202	\$1,593	\$1,339	\$ 253.80	\$246,948	\$4,823	\$1,216	\$16	\$1,200	\$3,624	\$377
2	22	\$246,948	\$1,593	\$1,338	\$ 255.18	\$246,693	\$3,624	\$1,216	\$12	\$1,204	\$2,420	\$377
2	23	\$246,693	\$1,593	\$1,336	\$ 256.56	\$246,436	\$2,420	\$1,216	\$8	\$1,208	\$1,212	\$377
2	24	\$246,436	\$1,593	\$1,335	\$ 257.95	\$246,178	\$1,212	\$1,216	\$4	\$1,212	\$0	\$377
3	25	\$246,178	\$1,593	\$1,333	\$ 259.35	\$245,919	\$0	\$0	\$0	(\$0)	\$0	\$1,593

Table 12: PAM Mechanics

As noted, the Net PMT by the borrower is \$377 for 2 years, and then jumps to \$1,593; the full rate.

PAM Yields

Table 13 (a): PAM Yields, Full Term, No Points

Year	T-PMT	T-EOP	P-PMT	P-INT	P-Amort	P-EOP	Net Pay
	(\$252,000)						
1	\$19,114	\$249,183	\$14,591	\$870	\$13,721	\$14,279	\$4,523
2	\$19,114	\$246,178	\$14,591	\$311	\$14,279	\$0	\$4,523
3	\$19,114	\$242,971	\$0	\$0	(\$0)	\$0	\$19,114
4	\$19,114	\$239,550	\$0	\$0	(\$0)	\$0	\$19,114
5	\$19,114	\$235,900	\$0	\$0	(\$0)	\$0	\$19,114
6	\$19,114	\$232,005	\$0	\$0	(\$0)	\$0	\$19,114
7	\$19,114	\$227,849	\$0	\$0	(\$0)	\$0	\$19,114
8	\$19,114	\$223,415	\$0	\$0	(\$0)	\$0	\$19,114
9	\$19,114	\$218,684	\$0	\$0	(\$0)	\$0	\$19,114
10	\$19,114	\$213,636	\$0	\$0	(\$0)	\$0	\$19,114
11	\$19,114	\$208,250	\$0	\$0	(\$0)	\$0	\$19,114
12	\$19,114	\$202,503	\$0	\$0	(\$0)	\$0	\$19,114
13	\$19,114	\$196,372	\$0	\$0	(\$0)	\$0	\$19,114
14	\$19,114	\$189,829	\$0	\$0	(\$0)	\$0	\$19,114
15	\$19,114	\$182,849	\$0	\$0	(\$0)	\$0	\$19,114
16	\$19,114	\$175,401	\$0	\$0	(\$0)	\$0	\$19,114
17	\$19,114	\$167,455	\$0	\$0	(\$0)	\$0	\$19,114
18	\$19,114	\$158,976	\$0	\$0	(\$0)	\$0	\$19,114
19	\$19,114	\$149,929	\$0	\$0	(\$0)	\$0	\$19,114
20	\$19,114	\$140,277	\$0	\$0	(\$0)	\$0	\$19,114
21	\$19,114	\$129,978	\$0	\$0	(\$0)	\$0	\$19,114
22	\$19,114	\$118,989	\$0	\$0	(\$0)	\$0	\$19,114
23	\$19,114	\$107,264	\$0	\$0	(\$0)	\$0	\$19,114
24	\$19,114	\$94,754	\$0	\$0	(\$0)	\$0	\$19,114
25	\$19,114	\$81,406	\$0	\$0	(\$0)	\$0	\$19,114
26	\$19,114	\$67,165	\$0	\$0	(\$0)	\$0	\$19,114
27	\$19,114	\$51,969	\$0	\$0	(\$0)	\$0	\$19,114
28	\$19,114	\$35,756	\$0	\$0	(\$0)	\$0	\$19,114
29	\$19,114	\$18,457	\$0	\$0	(\$0)	\$0	\$19,114
30	\$19,114	\$0	\$0	\$0	(\$0)	\$0	\$19,114
IRR Calculations							
Annual	6.41%						
Monthly	6.50%						

Again, the IRR to the lender is invariant to the financial structure and remains 6.5% annualized.

Table 13 (b): PAM Yields; With Points 10 Year Hold

Year	T-PMT	T-EOP	P-PMT	P-INT	P-Amort	P-EOP	Net Pay
	(\$244,440)						
1	\$19,114	\$249,183	\$14,591	\$870	\$13,721	\$14,279	\$4,523
2	\$19,114	\$246,178	\$14,591	\$311	\$14,279	\$0	\$4,523
3	\$19,114	\$242,971	\$0	\$0	(\$0)	\$0	\$19,114
4	\$19,114	\$239,550	\$0	\$0	(\$0)	\$0	\$19,114
5	\$19,114	\$235,900	\$0	\$0	(\$0)	\$0	\$19,114
6	\$19,114	\$232,005	\$0	\$0	(\$0)	\$0	\$19,114
7	\$19,114	\$227,849	\$0	\$0	(\$0)	\$0	\$19,114
8	\$19,114	\$223,415	\$0	\$0	(\$0)	\$0	\$19,114
9	\$19,114	\$218,684	\$0	\$0	(\$0)	\$0	\$19,114
10	\$232,750	\$0	\$0	\$0	(\$0)	\$0	\$232,750

IRR Calculations	
Annual	6.90%
Monthly	6.94%

Note: the actual loan is \$252,000; after points \$244,000

In calculating the yields after all points, keep in mind the 2% fee for the PAM account. That should be deducted from the initial loan proceeds as with the Points and Charges on the base loan.

Table 13 (b): PAM Yields; With Points, Prepayment Penalty and 5 year Hold

Year	T-PMT	T-EOP	P-PMT	P-INT	P-Amort	P-EOP	Net Pay
	(\$243,880)						
1	\$19,114	\$249,183	\$14,591	\$870	\$13,721	\$14,279	\$4,523
2	\$19,114	\$246,178	\$14,591	\$311	\$14,279	\$0	\$4,523
3	\$19,114	\$242,971	\$0	\$0	(\$0)	\$0	\$19,114
4	\$19,114	\$239,550	\$0	\$0	(\$0)	\$0	\$19,114
5	\$259,738	\$0	\$0	\$0	(\$0)	\$0	\$259,738
6	\$0	\$0	\$0	\$0	\$0	\$0	\$0

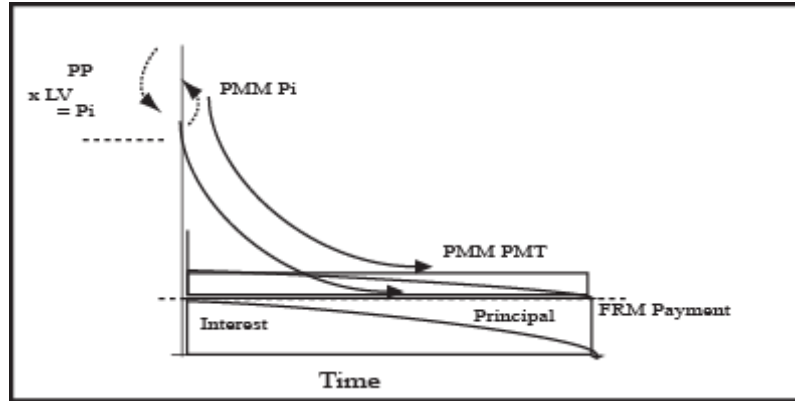
IRR Calculations	
Annual	7.61%
Monthly	7.62%

As expected, with a shorter hold and Prepayment Penalty, the Yield Rises.

Purchase Money Mortgages (PMM)

Overview

The Purchase Money Mortgage is a form of seller financing. In some cases, the PMM could be for the entire amount of the loan, although in most cases it is a supplemental loan that is granted on top of a first mortgage. In such cases, the loan can be used to cover a portion of the downpayment that remains after a primary lender applies an LV ratio and.



In other cases it can be used to reduce payments on the first mortgage to allow the borrower to attract more funds than would be supported by applying the MCR against the borrower's income. In effect, the buyer takes on a junior loan at the closing which is then repaid at some agreed rate --typically higher than the FRM-- over some agreed period of time. This PMM may be structured in a number of ways and may include amortization depending on the needs and preferences of the buyer and seller.

PMM Base Case

Table 14 (a): PMM Base Case

Traditional Mortgage	Inputs	Code
Purchase Price	\$280,000	PP
Mortgage Terms		
Loan-to-Value	80%	LV
Rate	6.50%	Mi
Term	30	t
Periodicity	12	N
Mortgage Fees		
Origination Fee	1%	FeeO
Points	2%	Pts
Prepayment Penalty	2%	PP
Equity Capital		
Mortgage Capture Ratio	28%	MCR
Expected Holding Period	30	E(HP)
Cost of Capital	10%	Ec

As noted in Table 14, the PMM base case contains the same fundamental assumptions regarding the underlying first mortgage as those in the FRM case. The difference resides in the addition of a separate loan from the seller which is on top of the first mortgage. In effect, the LV ratio increases since the borrower now has two mortgages outstanding: the first, and the PMM which is a second mortgage.

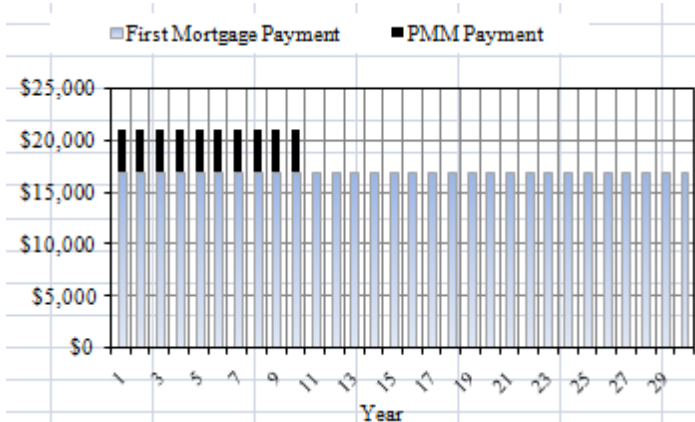
Table 14 (b): PMM Capital Structure

Sources of Capital		Code
Initial Principal	\$ 224,000	Pi
Initial Equity	\$ 56,000	Ei
Total Capital	\$ 280,000	Tcap
Purchase Money Mortgage		
PMM LV	10%	
PMM Rate	8%	
Term	10	
Periodicity	12	
Combined LV: FRM + PMM	90%	
Financial Structure (Calculated)		
Traditional First Mortgage	\$ 224,000	
PMM	\$ 28,000	
Equity	\$ 28,000	
Total Capital	\$ 280,000	

In the traditional FRM, the borrower would come up with \$56,000 in equity. In the PMM, the seller is providing \$28,000 of that funding, reducing the borrower's Equity to \$28,000. In terms of the first lender, the borrower is still within the 28% max. MCR. However, after the PMM, the total mortgage debt payments exceed that threshold.

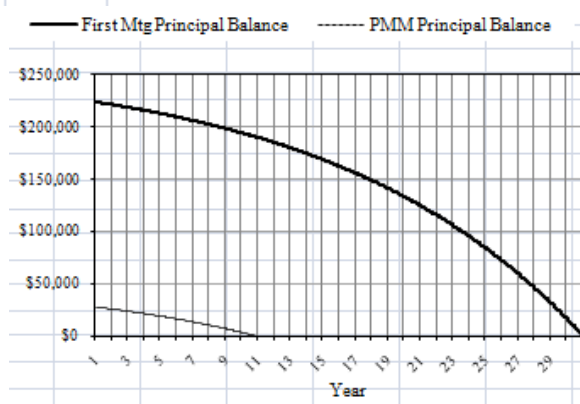
PMM Visualization: Cash Flows and Principal Balances

Exhibit 9 (a): PMM Cash Flows



The higher payments on the PMM are tacked onto the FRM, although the two are separate commitments for the borrower. Due to high debt load, the risk of default is higher than would occur with the FRM alone.

Exhibit 9 (b): PMM Principal Balances



PMM Mechanics

Table 15: PMM Mechanics

Year	Mo	T-BOP	T-PMT	T-INT	T-AMORT	T-EOP	PMM	P-PM	P-INT	P-AMT	PMMEO	Tot-PMT
			(\$217,280)			\$224,000						
1	1	\$224,000	\$1,416	\$1,213	\$ 202.50	\$223,798	\$28,000	\$340	\$187	\$153	\$27,847	\$1,756
1	2	\$223,798	\$1,416	\$1,212	\$ 203.60	\$223,594	\$27,847	\$340	\$186	\$154	\$27,693	\$1,756
1	3	\$223,594	\$1,416	\$1,211	\$ 204.70	\$223,389	\$27,693	\$340	\$185	\$155	\$27,538	\$1,756
1	4	\$223,389	\$1,416	\$1,210	\$ 205.81	\$223,183	\$27,538	\$340	\$184	\$156	\$27,382	\$1,756
1	5	\$223,183	\$1,416	\$1,209	\$ 206.92	\$222,976	\$27,382	\$340	\$183	\$157	\$27,224	\$1,756
1	6	\$222,976	\$1,416	\$1,208	\$ 208.04	\$222,768	\$27,224	\$340	\$181	\$158	\$27,066	\$1,756
1	7	\$222,768	\$1,416	\$1,207	\$ 209.17	\$222,559	\$27,066	\$340	\$180	\$159	\$26,907	\$1,756
1	8	\$222,559	\$1,416	\$1,206	\$ 210.30	\$222,349	\$26,907	\$340	\$179	\$160	\$26,747	\$1,756
1	9	\$222,349	\$1,416	\$1,204	\$ 211.44	\$222,138	\$26,747	\$340	\$178	\$161	\$26,585	\$1,756
1	10	\$222,138	\$1,416	\$1,203	\$ 212.59	\$221,925	\$26,585	\$340	\$177	\$162	\$26,423	\$1,756
1	11	\$221,925	\$1,416	\$1,202	\$ 213.74	\$221,711	\$26,423	\$340	\$176	\$164	\$26,259	\$1,756
1	12	\$221,711	\$1,416	\$1,201	\$ 214.90	\$221,496	\$26,259	\$340	\$175	\$165	\$26,095	\$1,756
2	13	\$221,496	\$1,416	\$1,200	\$ 216.06	\$221,280	\$26,095	\$340	\$174	\$166	\$25,929	\$1,756

Since the PMM has a 10 year term, the cash flows remain the same until the PMM is retired. At that point the borrower's payment decline to the \$1,416 level that matches a traditional loan repayment schedule.

10	109	\$194,386	\$1,416	\$1,053	\$ 362.91	\$194,023	\$3,905	\$340	\$26	\$314	\$3,592	\$1,756
10	110	\$194,023	\$1,416	\$1,051	\$ 364.88	\$193,658	\$3,592	\$340	\$24	\$316	\$3,276	\$1,756
10	111	\$193,658	\$1,416	\$1,049	\$ 366.85	\$193,291	\$3,276	\$340	\$22	\$318	\$2,958	\$1,756
10	112	\$193,291	\$1,416	\$1,047	\$ 368.84	\$192,922	\$2,958	\$340	\$20	\$320	\$2,638	\$1,756
10	113	\$192,922	\$1,416	\$1,045	\$ 370.84	\$192,551	\$2,638	\$340	\$18	\$322	\$2,316	\$1,756
10	114	\$192,551	\$1,416	\$1,043	\$ 372.85	\$192,178	\$2,316	\$340	\$15	\$324	\$1,992	\$1,756
10	115	\$192,178	\$1,416	\$1,041	\$ 374.87	\$191,804	\$1,992	\$340	\$13	\$326	\$1,665	\$1,756
10	116	\$191,804	\$1,416	\$1,039	\$ 376.90	\$191,427	\$1,665	\$340	\$11	\$329	\$1,337	\$1,756
10	117	\$191,427	\$1,416	\$1,037	\$ 378.94	\$191,048	\$1,337	\$340	\$9	\$331	\$1,006	\$1,756
10	118	\$191,048	\$1,416	\$1,035	\$ 380.99	\$190,667	\$1,006	\$340	\$7	\$333	\$673	\$1,756
10	119	\$190,667	\$1,416	\$1,033	\$ 383.05	\$190,284	\$673	\$340	\$4	\$335	\$337	\$1,756
10	120	\$190,284	\$1,416	\$1,031	\$ 385.13	\$189,899	\$337	\$340	\$2	\$337	(\$0)	\$1,756
11	121	\$189,899	\$1,416	\$1,029	\$ 387.22	\$189,511	(\$0)	\$0	(\$0)	\$0	(\$0)	\$1,416

As noted, the PMM in the example is self-liquidating, being drawn down over the 10 years of the commitment. If the loan were extended, the payments would decline due to lower amortization requirements.

PMM Yields

Table 16 (a): PMM Yields, Full Term, No Points

Year	T-PMT	T-EOP	PMM-PM	PMM-IN	POO-Am	PMM-EOP	Tot-PMT	Tot-EOP
	(\$224,000)		(\$28,000)				(\$252,000)	
1	\$16,990	\$221,496	\$4,077	\$2,171	\$1,905	\$26,095	\$21,067	\$247,591
2	\$16,990	\$218,825	\$4,077	\$2,013	\$2,064	\$24,031	\$21,067	\$242,856
3	\$16,990	\$215,975	\$4,077	\$1,842	\$2,235	\$21,796	\$21,067	\$237,771
4	\$16,990	\$212,933	\$4,077	\$1,656	\$2,420	\$19,376	\$21,067	\$232,309
5	\$16,990	\$209,689	\$4,077	\$1,455	\$2,621	\$16,754	\$21,067	\$226,443
6	\$16,990	\$206,226	\$4,077	\$1,238	\$2,839	\$13,915	\$21,067	\$220,142
7	\$16,990	\$202,532	\$4,077	\$1,002	\$3,074	\$10,841	\$21,067	\$213,373
8	\$16,990	\$198,591	\$4,077	\$747	\$3,330	\$7,511	\$21,067	\$206,102
9	\$16,990	\$194,386	\$4,077	\$471	\$3,606	\$3,905	\$21,067	\$198,291
10	\$16,990	\$189,899	\$4,077	\$171	\$3,905	(\$0)	\$21,067	\$189,899
11	\$16,990	\$185,111	\$0	(\$0)	\$0	(\$0)	\$16,990	\$185,111
12	\$16,990	\$180,003	\$0	(\$0)	\$0	(\$0)	\$16,990	\$180,003
13	\$16,990	\$174,553	\$0	(\$0)	\$0	(\$0)	\$16,990	\$174,553
14	\$16,990	\$168,737	\$0	(\$0)	\$0	(\$0)	\$16,990	\$168,737
15	\$16,990	\$162,532	\$0	(\$0)	\$0	(\$0)	\$16,990	\$162,532
16	\$16,990	\$155,912	\$0	(\$0)	\$0	(\$0)	\$16,990	\$155,912
17	\$16,990	\$148,849	\$0	(\$0)	\$0	(\$0)	\$16,990	\$148,849
18	\$16,990	\$141,312	\$0	(\$0)	\$0	(\$0)	\$16,990	\$141,312
19	\$16,990	\$133,270	\$0	(\$0)	\$0	(\$0)	\$16,990	\$133,270
20	\$16,990	\$124,690	\$0	(\$0)	\$0	(\$0)	\$16,990	\$124,690
21	\$16,990	\$115,536	\$0	(\$0)	\$0	(\$0)	\$16,990	\$115,536
22	\$16,990	\$105,768	\$0	(\$0)	\$0	(\$0)	\$16,990	\$105,768
23	\$16,990	\$95,346	\$0	(\$0)	\$0	(\$0)	\$16,990	\$95,346
24	\$16,990	\$84,226	\$0	(\$0)	\$0	(\$0)	\$16,990	\$84,226
25	\$16,990	\$72,361	\$0	(\$0)	\$0	(\$0)	\$16,990	\$72,361
26	\$16,990	\$59,702	\$0	(\$0)	\$0	(\$0)	\$16,990	\$59,702
27	\$16,990	\$46,195	\$0	(\$0)	\$0	(\$0)	\$16,990	\$46,195
28	\$16,990	\$31,783	\$0	(\$0)	\$0	(\$0)	\$16,990	\$31,783
29	\$16,990	\$16,407	\$0	(\$0)	\$0	(\$0)	\$16,990	\$16,407
30	\$17,004	\$0	\$0	(\$0)	\$0	(\$0)	\$17,004	(\$0)
IRR Calculations			IRR Calculations				IRR Calculations	
Annual	6.41%		7.49%				6.47%	
Monthly	6.50%		8.00%				6.58%	

Table 16 presents the cash flows for the aggregate financing. As noted, the first mortgage is a FRM which is fully amortizing over the 30 year term. As such, if Origination Fees and Points are ignored, the yield is 6.5% as in a traditional loan. With respect to the PMM, if it goes full term, the monthly IRR is 8.00%, the coupon rate. When the two loans are combined, the IRR cost to the borrower is 6.58% since the FRM mortgage comprises the bulk of the borrower funds.

Table 16 (b): PMM Yields, 10 year Hold, with Points & Prepayment Penalty

Year	T-PMT	T-EOP	PMM-PM	PMM-IN	POO-Am	PMM-EOP	Tot-PMT	Tot-EOP
	(\$217,280)		(\$28,000)				(\$245,280)	
1	\$16,990	\$221,496	\$4,077	\$2,171	\$1,905	\$26,095	\$21,067	\$247,591
2	\$16,990	\$218,825	\$4,077	\$2,013	\$2,064	\$24,031	\$21,067	\$242,856
3	\$16,990	\$215,975	\$4,077	\$1,842	\$2,235	\$21,796	\$21,067	\$237,771
4	\$16,990	\$212,933	\$4,077	\$1,656	\$2,420	\$19,376	\$21,067	\$232,309
5	\$16,990	\$209,689	\$4,077	\$1,455	\$2,621	\$16,754	\$21,067	\$226,443
6	\$16,990	\$206,226	\$4,077	\$1,238	\$2,839	\$13,915	\$21,067	\$220,142
7	\$16,990	\$202,532	\$4,077	\$1,002	\$3,074	\$10,841	\$21,067	\$213,373
8	\$16,990	\$198,591	\$4,077	\$747	\$3,330	\$7,511	\$21,067	\$206,102
9	\$16,990	\$194,386	\$4,077	\$471	\$3,606	\$3,905	\$21,067	\$198,291
10	\$210,694	\$0	\$4,077	\$171	\$3,905	\$0	\$214,771	\$0
11	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

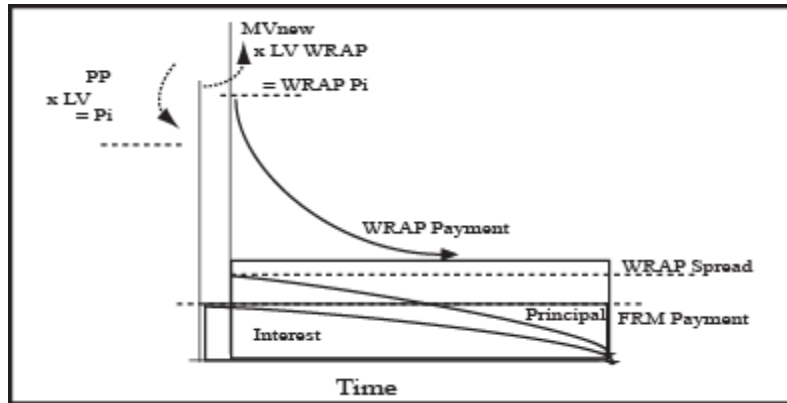
IRR Calculations		IRR Calculations		IRR Calculations	
Annual	7.04%	7.49%		7.07%	
Monthly	7.07%	8.00%		7.14%	

As noted in Table 16, in the PMM arrangement, when Points, Fees and Prepayment penalties are considered, the yield or cost of capital rises, with the FRM increasing to slightly over 7% annualized.

Wraparound Mortgages (WRAP)

Overview

A Wraparound Mortgage is a new mortgage which is designed to extend the life of a current loan beyond the ownership period for the original borrower. In effect, borrower sells the property to third party, using “seller financing” for the entire amount of the new loan. This new loan is determined by applying a LV ratio to the then-current market value. The new borrower then makes mortgage payments to the seller who continues to make the underlying mortgage payments and pockets the spread between the new payments and the existing mortgage payments. The seller earns interest on the amount of new money provided to the buyer, as well as the arbitrage generated by differences between the new loan rate and the existing underlying rate. The title remains with the seller and the existing mortgage remains in place until the property is sold or the mortgage is repaid.



WRAP Base Case

Table 17 (a): WRAP Base Case

Traditional Mortgage			Code
Purchase Price	\$ 280,000		PP
Mortgage Terms			
Loan-to-Value	80%		LV
Rate	6.50%		Mi
Term	30		t
Periodicity	12		N
Mortgage Fees			
Origination Fee	1%		FeeO
Points	2%		Pts
Prepayment Penalty	1%		PP
Equity Capital			
Mortgage Capture Ratio	28%		MCR
Expected Holding Period	4		E(HP)
Cost of Capital	10%		Ec
Sources of Capital			Code
Initial Principal	\$ 224,000		Pi
Initial Equity	\$ 56,000		Ei
Total Capital	\$ 280,000		Tcap

Table 17 (b): WRAP Capital Structure

WRAP Mortgage	
WRAP LV	95%
WRAP Rate	7.0%
WRAP Begin Year	3
Term (begin yr-end yr)	28
Periodicity	12
Appreciation	2%
WRAP Loan	\$276,386

WRAP Visualization: Cash Flows and Principal Balances

Exhibit 10 (a): WRAP Cash Flows

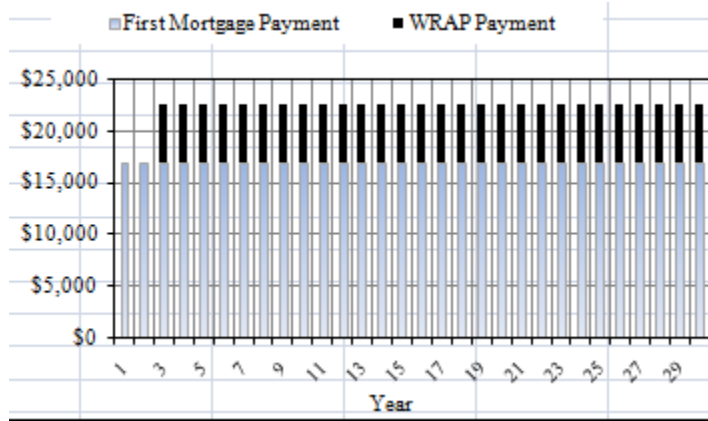
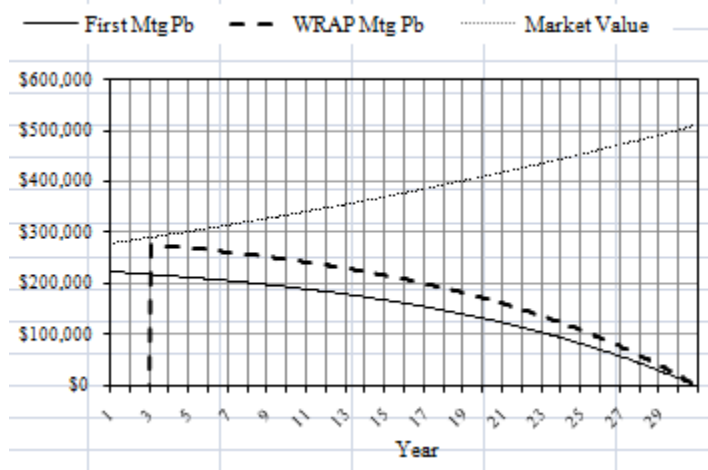


Exhibit 10 (b): WRAP Principal Balances



In terms of capital structure, the WRAP loan has something of a “wrinkle.” That is, when the WRAP LV ratio of 95% is applied, the Market Value has risen by the assumed inflation rate (i.e., $\$280,000 \times (1+2\%)^2$). Applying the 95% LV to the $\$291,417$ value translates to $\$276,386$ loan. In this structure, the original loan will stay in place. In this case, both loans will be amortized over the remaining term although the 2nd mortgage may be a balloon loan or take some other form.

WRAP Mechanics

In effect, in a WRAP loan, a buyer is purchasing a property subject to two separate loans; the original first which is kept in place --along with its first priority claim-- as well as the new money implicitly advanced by the seller. There are several attractions to this structure for a potential buyer. First, assuming the interest rate on the initial loan is below the current market, the seller can accept a lower rate and pass the savings through to the buyer. Second, the buyer may not have the downpayment necessary to purchase the house with traditional financing. Third, the buyer may have some credit problems or a low credit score which would preclude obtaining a new mortgage or trigger a higher interest rate. On the downside, the buyer is not in as secure a position as if they bought the house outright and obtained new financing. This is due to the fact that the seller still holds title and must pass through the payments from the buyer to the initial mortgagee to avoid delinquency, foreclosure. In addition, the buyer’s position may not be as liquid, with the financial structure creating some complications relative to typical transactions.

effectively receives an extra \$71/month which is the unearned “arbitrage” return.

WRAP Yields

Table 19 (a): WRAP Yields, Full Term, No Points

Year	T-PMT	W-PMT	S-PMT	Excess	SellTotal
	(\$224,000)				
1	\$16,990	\$0	\$0	\$0	\$0
2	\$16,990	(\$276,386)	(\$57,561)	\$0	(\$57,561)
3	\$16,990	\$22,540	\$4,694	\$856	\$5,550
4	\$16,990	\$22,540	\$4,694	\$856	\$5,550
5	\$16,990	\$22,540	\$4,694	\$856	\$5,550
6	\$16,990	\$22,540	\$4,694	\$856	\$5,550
7	\$16,990	\$22,540	\$4,694	\$856	\$5,550
8	\$16,990	\$22,540	\$4,694	\$856	\$5,550
9	\$16,990	\$22,540	\$4,694	\$856	\$5,550
10	\$16,990	\$22,540	\$4,694	\$856	\$5,550
11	\$16,990	\$22,540	\$4,694	\$856	\$5,550
12	\$16,990	\$22,540	\$4,694	\$856	\$5,550
13	\$16,990	\$22,540	\$4,694	\$856	\$5,550
14	\$16,990	\$22,540	\$4,694	\$856	\$5,550
15	\$16,990	\$22,540	\$4,694	\$856	\$5,550
16	\$16,990	\$22,540	\$4,694	\$856	\$5,550
17	\$16,990	\$22,540	\$4,694	\$856	\$5,550
18	\$16,990	\$22,540	\$4,694	\$856	\$5,550
19	\$16,990	\$22,540	\$4,694	\$856	\$5,550
20	\$16,990	\$22,540	\$4,694	\$856	\$5,550
21	\$16,990	\$22,540	\$4,694	\$856	\$5,550
22	\$16,990	\$22,540	\$4,694	\$856	\$5,550
23	\$16,990	\$22,540	\$4,694	\$856	\$5,550
24	\$16,990	\$22,540	\$4,694	\$856	\$5,550
25	\$16,990	\$22,540	\$4,694	\$856	\$5,550
26	\$16,990	\$22,540	\$4,694	\$856	\$5,550
27	\$16,990	\$22,540	\$4,694	\$856	\$5,550
28	\$16,990	\$22,540	\$4,694	\$856	\$5,550
29	\$16,990	\$22,540	\$4,694	\$856	\$5,550
30	\$17,018	\$22,518	\$4,692	\$808	\$5,500
IRR	Annual			Seller	
Lender	6.41%	6.89%	6.89%	Annual	8.71%
Monthly	6.50%	7.00%	7.00%	Monthly	8.82%

As noted in Table 19 (a), the WRAP mortgage structure

Table 19 (b): WRAP Yields; No Points, 10 Year Hold

Year	T-FRM	WRAP	SELLERearn	SELLERtot
	(\$224,000)			
1	\$16,990	\$0	\$0	\$0
2	\$16,990	(\$276,386)	(\$57,561)	(\$57,561)
3	\$16,990	\$22,540	\$4,694	\$5,550
4	\$16,990	\$22,540	\$4,694	\$5,550
5	\$16,990	\$22,540	\$4,694	\$5,550
6	\$16,990	\$22,540	\$4,694	\$5,550
7	\$16,990	\$22,540	\$4,694	\$5,550
8	\$16,990	\$22,540	\$4,694	\$5,550
9	\$16,990	\$22,540	\$4,694	\$5,550
10	\$206,889	\$264,813	\$55,151	\$57,925

IRR	Annual		Seller	
Lender	6.45%	6.95%	6.95%	8.82%
Monthly	6.50%	7.00%	7.00%	8.86%

As noted, the three “loans” all earn the stated rates with no points or penalties. The FRM is at 6.5% and the WRAP and the Earned part of the Seller’s position are at 7%; the WRAP rate. However, since the Seller gets the spread from the arbitrage, the Seller’s total yield rises.

Table 19 (c): WRAP Yields, Points and Prepayment, 5 Year Hold

Year	T-FRM	WRAP	SELLERearn
	(\$217,280)		
1	\$16,990	\$0	\$0
2	\$16,990	(\$276,386)	(\$57,561)
3	\$16,990	\$22,540	\$4,694
4	\$16,990	\$22,540	\$4,694
5	\$230,878	\$288,301	\$60,042
6	\$0	\$0	\$0

IRR	Annual		Seller
Lender	7.55%	6.96%	6.96%
Monthly	7.56%	7.00%	7.00%

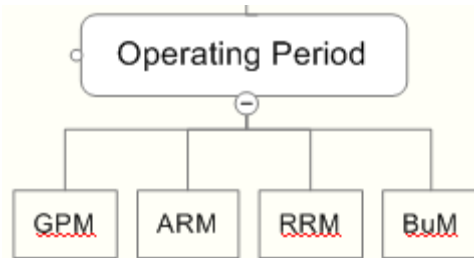
When points and prepayment penalties are added in, the only change in yield is to the FRM on which the points were charged. If the WRAP had points, that yield would also be increased.

Operating Period Mortgages

Introduction

This class of mortgages is distinct in the sense that they focus on the pattern and level of payments that occur during the operating period in which the outstanding loan is being repaid. While their ability to lower initial required payments helps increase the “capital capture potential” or borrowing power of a household on fixed income, they do so during the operating period. The general class of holding period impact mortgages includes: GPMs; ARMs and RRM; and BuMs. Within each of the mortgage classes, various terms can be combined to provide an array of options which could make comprehension of them at a mechanical level daunting. However, their increasing presence in real estate finance --especially ARMS-- and the inherent risks the generate dictates that they must be explored at a relatively detailed level to put them in perspective and provide a basis for anticipating their impact on the broader housing market. To simplify the discussion, the variations in the assumed market rate are held to a minimal level. Based on an understanding of these simplified examples, you should be able to substitute your own expectations to obtain more realistic, market-based offerings.

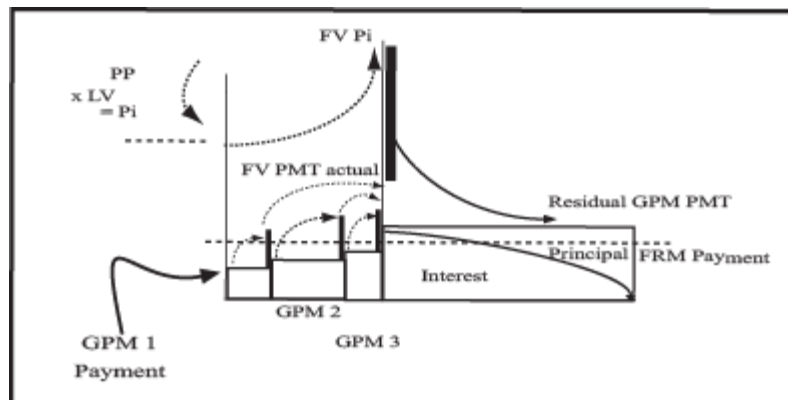
Exhibit 11: Operating Period Mortgage Overview



Graduated Payment Mortgages (GPM)

Overview

A GPM shares some commonalities with BDM and PAM mortgages, in the sense that in the early years, mortgage payments are reduced below the level required for traditional FRMs. However, rather than being drawn from a separate front-end lump sum account, the GPM subsidy is provided by higher offsetting monthly payments later in the life of the mortgage. Thus, a GPM is a structured form of financing in which the periodic payments are increased at scheduled times by scheduled amounts. During the early years, the



periodic payments are increased at scheduled times by scheduled amounts. During the early years, the

buyer's required payment is not sufficient to fully amortize the mortgage over the term of the loan. However, to provide the lender with the required market rate of return, the deficit between the required rate of return is offset by higher payments during the latter term of the mortgage. In effect, the borrower is facing a known step payment pattern in required payments. Under a typical GPM, the Present Value of the stepped payments discounted by the mortgage rate must be sufficient to equal the initial principal balance. To achieve this parity, the gap between the pay rate (i.e., level of the steps) and the earned rate at the mortgage rate is compounded) forward to a future value. Once this future value is calculated at the end of the cumulative period of steps, the residual payments necessary to fully amortize the loan over the remaining term of the loan can be calculated. In a variable rate version of this mortgage arrangement (i.e., a GPAM), the earned rates over the deferral period, as well as the rate over the residual term, can fluctuate according to some index, creating an "adjustable rate" loan in which interest rate risk is shifted to the borrower.

GPM Base Case

**Table 20 (a): GPM Base Case
Graduated Payment Mortgage**

Traditional Mortgage		Code
Purchase Price	\$ 280,000	Pi
Mortgage Terms		
Loan-to-Value	80%	LV
Rate	6.50%	Mr
Term	30	T
Periodicity	12	Per
Mortgage Fees		
Origination Fee		FeeO
Points		Pts
Prepayment Penalty		PP
Equity Capital		
Mortgage Capture Ratio	28%	MCR
Expected Holding Period	30	E(HP)
Cost of Capital	10%	Ec
HHI Actual	\$40,000	HHI
Max Mortgage Payment	\$ 933.33	Mb
Sources of Capital		Code
Initial Principal	\$ 224,000	Pi
Initial Equity	\$ 56,000	Ei
Total Capital	\$ 280,000	CAPt

In the GPM, the FRM assumptions create the benchmark against which the GPM payment pattern is established. To justify the effort to structure financing through a GPM, the lender must receive some added compensation in terms of higher mortgage spreads or higher points or fees. Alternatively, such instruments may be used to help support the market by making mortgages more "affordable" without requiring a price adjustments.

Note that we can "back into" the "affordable payment" using the actual household income (HHIa) of the borrower to arrive at a \$933.67 monthly budget. This becomes the first "step" and represents a significant reduction over the \$1,416 monthly payment required to amortize a fixed rate mortgage.

As noted in Table 20 (b), the GPM steps are laid out in a pattern in terms of the length of each step. This pattern would be established in advance to let the borrower certainty as to the required payments that must be covered during the predefined steps. It also allows the

borrower to understand the residual payments that will be required after the cumulative step period has passed to fully amortize the mortgage over the initial term. Thus, a GPM helps increase the purchasing power of a household as does an Adjustable Rate Mortgage. However, a fundamental difference is the GPM lets them avoid taking the interest rate risk.

Table 20 (b): GPM Steps for Base Case

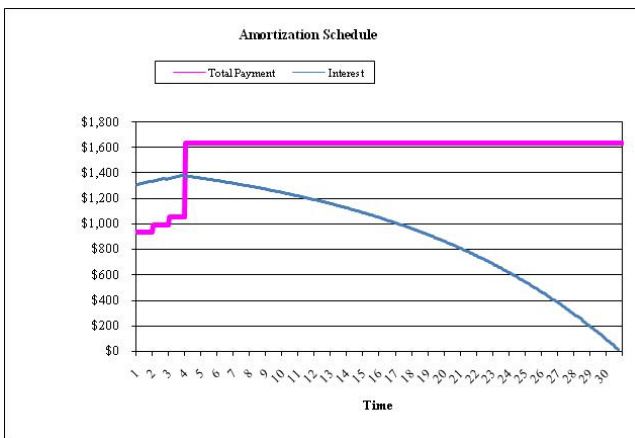
GPM Pattern		
	Steps	GPM Rate
GPM Premium	0.50%	7.00%
Rate		
Planned Step in monthly Payment	6.0%	
Steps	Years	Cum Steps
Step 1	1	
Step 2	1	2
Step 3	1	3

The lender in a GPM may charge a higher interest rate to compensate for the added risk of foreclosure, the lower liquidity of such mortgages, and the higher costs of loan servicing. In this case, the borrower pays a 50bp premium on the 6.5% FRM rate, increasing the GPM rate to 7% annualized. Beginning with the first step, the payments will increase 6%

per step. Thus, for the first year, the initial payment will be \$933 and then rise to \$1,237 for the next year and \$1,311 for the last two years (i.e., 3-4). This compares to the \$1,416 the borrower would normally pay for the FRM.

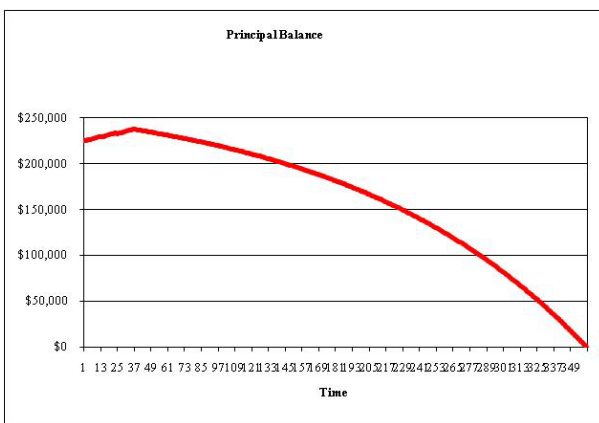
GPM Visualization: Cash Flows and Principal Balances

Exhibit 12 (a): GPM Cash Flows



As noted in Exhibit 12 (a), the payment is predefined during the “step periods,” shifting some of the burden to return a revenue-neutral present value to the lender to the later years.

Exhibit 12 (b): GPM Principal Balances



In effect, the borrower has a negative amortization loan during the “step period,” with the amount of the negative amortization equal to the future value of the gap between the interest-only payment that would be charged during the steps, and the actual payment. As a result, the Pb grows during the steps, but then declines to fully amortize or pay off by the end of the full term.

Table 21: GPM Pattern 1

Year	Mo	PRIN BOP	Req PMT	INT	ReqINT	AMORT	PMT/Step	PMT GAP	FV GAP	PRIN-EOP
1	1	\$224,000	\$0	\$0	\$1,307	\$ -	\$933.33	(\$373.33)	\$373	\$224,373
1	2	\$224,373	\$0	\$0	\$1,309	\$ -	\$933.33	(\$375.51)	\$753	\$224,753
1	3	\$224,753	\$0	\$0	\$1,311	\$ -	\$933.33	(\$377.73)	\$1,140	\$225,140
1	4	\$225,140	\$0	\$0	\$1,313	\$ -	\$933.33	(\$379.98)	\$1,533	\$225,533
1	5	\$225,533	\$0	\$0	\$1,316	\$ -	\$933.33	(\$382.28)	\$1,934	\$225,934
1	6	\$225,934	\$0	\$0	\$1,318	\$ -	\$933.33	(\$384.61)	\$2,342	\$226,342
1	7	\$226,342	\$0	\$0	\$1,320	\$ -	\$933.33	(\$386.99)	\$2,757	\$226,757
1	8	\$226,757	\$0	\$0	\$1,323	\$ -	\$933.33	(\$389.41)	\$3,180	\$227,180
1	9	\$227,180	\$0	\$0	\$1,325	\$ -	\$933.33	(\$391.88)	\$3,610	\$227,610
1	10	\$227,610	\$0	\$0	\$1,328	\$ -	\$933.33	(\$394.39)	\$4,049	\$228,049
1	11	\$228,049	\$0	\$0	\$1,330	\$ -	\$933.33	(\$396.95)	\$4,496	\$228,496
1	12	\$228,496	\$0	\$0	\$1,333	\$ -	\$933.33	(\$399.56)	\$4,952	\$228,952
2	13	\$228,952	\$0	\$0	\$1,336	\$ -	\$989.33	(\$346.22)	\$4,662	\$228,662
2	14	\$228,662	\$0	\$0	\$1,334	\$ -	\$989.33	(\$344.53)	\$5,011	\$229,011
2	15	\$229,011	\$0	\$0	\$1,336	\$ -	\$989.33	(\$346.56)	\$5,416	\$229,416
2	16	\$229,416	\$0	\$0	\$1,338	\$ -	\$989.33	(\$348.93)	\$5,834	\$229,834
2	17	\$229,834	\$0	\$0	\$1,341	\$ -	\$989.33	(\$351.36)	\$6,260	\$230,260
2	18	\$230,260	\$0	\$0	\$1,343	\$ -	\$989.33	(\$353.85)	\$6,695	\$230,695
2	19	\$230,695	\$0	\$0	\$1,346	\$ -	\$989.33	(\$356.39)	\$7,139	\$231,139
2	20	\$231,139	\$0	\$0	\$1,348	\$ -	\$989.33	(\$358.98)	\$7,592	\$231,592
2	21	\$231,592	\$0	\$0	\$1,351	\$ -	\$989.33	(\$361.62)	\$8,054	\$232,054
2	22	\$232,054	\$0	\$0	\$1,354	\$ -	\$989.33	(\$364.31)	\$8,525	\$232,525
2	23	\$232,525	\$0	\$0	\$1,356	\$ -	\$989.33	(\$367.07)	\$9,007	\$233,007
2	24	\$233,007	\$0	\$0	\$1,359	\$ -	\$989.33	(\$369.87)	\$9,499	\$233,499
3	25	\$233,499	\$0	\$0	\$1,362	\$ -	\$1,048.69	(\$313.38)	\$8,408	\$232,408
3	26	\$232,408	\$0	\$0	\$1,356	\$ -	\$1,048.69	(\$307.02)	\$8,593	\$232,593
3	27	\$232,593	\$0	\$0	\$1,357	\$ -	\$1,048.69	(\$308.10)	\$8,981	\$232,981
3	28	\$232,981	\$0	\$0	\$1,359	\$ -	\$1,048.69	(\$310.36)	\$9,410	\$233,410
3	29	\$233,410	\$0	\$0	\$1,362	\$ -	\$1,048.69	(\$312.87)	\$9,855	\$233,855
3	30	\$233,855	\$0	\$0	\$1,364	\$ -	\$1,048.69	(\$315.46)	\$10,310	\$234,310
3	31	\$234,310	\$0	\$0	\$1,367	\$ -	\$1,048.69	(\$318.11)	\$10,775	\$234,775
3	32	\$234,775	\$0	\$0	\$1,370	\$ -	\$1,048.69	(\$320.83)	\$11,251	\$235,251
3	33	\$235,251	\$0	\$0	\$1,372	\$ -	\$1,048.69	(\$323.61)	\$11,738	\$235,738
3	34	\$235,738	\$0	\$0	\$1,375	\$ -	\$1,048.69	(\$326.45)	\$12,237	\$236,237
3	35	\$236,237	\$0	\$0	\$1,378	\$ -	\$1,048.69	(\$329.36)	\$12,748	\$236,748
3	36	\$236,748	\$0	\$0	\$1,381	\$ -	\$1,048.69	(\$332.33)	\$13,270	\$237,270
4	37	\$237,270	\$1,632	\$1,384		\$ 247.90	\$0	\$0.00	\$0	\$237,022
4	38	\$237,022	\$1,632	\$1,383		\$ 249.35	\$0	\$0.00	\$0	\$236,773
4	39	\$236,773	\$1,632	\$1,381		\$ 250.80	\$0	\$0.00	\$0	\$236,522
4	40	\$236,522	\$1,632	\$1,380		\$ 252.27	\$0	\$0.00	\$0	\$236,270
4	41	\$236,270	\$1,632	\$1,378		\$ 253.74	\$0	\$0.00	\$0	\$236,016
4	42	\$236,016	\$1,632	\$1,377		\$ 255.22	\$0	\$0.00	\$0	\$235,761
4	43	\$235,761	\$1,632	\$1,375		\$ 256.71	\$0	\$0.00	\$0	\$235,504
4	44	\$235,504	\$1,632	\$1,374		\$ 258.21	\$0	\$0.00	\$0	\$235,246
4	45	\$235,246	\$1,632	\$1,372		\$ 259.71	\$0	\$0.00	\$0	\$234,986
4	46	\$234,986	\$1,632	\$1,371		\$ 261.23	\$0	\$0.00	\$0	\$234,725
4	47	\$234,725	\$1,632	\$1,369		\$ 262.75	\$0	\$0.00	\$0	\$234,462
4	48	\$234,462	\$235,830	\$1,368		\$ 234,462.24	\$0	\$0.00	\$0	\$0

As noted in Table 21 (a), during the initial step phases of the GPM, the borrower will only be charged INTEREST that would be required to provide a return “ON” the mortgage. This is opposed to a PAYMENT which would provide a return “ON” and “OF” the outstanding principal. That is, there is no reduction in principal via amortization during the step periods. Rather, the loan has negative amortization in which the gap between the interest required (PRIN BOP * INT% each month and the actual payments noted in the PMT/Step. For example in the first month:

- The PRIN BOP is \$224,000 which, when multiplied by 7.0%/12 is \$1,307 in interest (ReqINT) that is owed to the lender.
- The PMT/Step is the Household Income (HHI) multiplied by the Mortgage Capture Ratio of 28% to equal \$933.33. This is what the borrower can afford to pay given their \$40,000 income (see: Input assumptions).
- The PMT GAP between the ReqINT and the PMT/Step is the shortage in funding which in the first month is \$373/33). This amount is compounded forward via a FV calculation to determine the increased PRIN owed to the lender (PRIN-EOP). This calculation is at the GPM rate which is the FRM rate of 6.5% plus the 50bp premium which equals 7.0%.
- In the second month, the ReqINT increases because the PRIN-BOP rises to equal the prior periods EOP. This process continues for each step. For example, in the 2nd step, the PMT/Step increases to \$989.33 which is the initial amount inflated by the 6% step increase. This is repeated for each step.
- Once the Steps are completed, the loan turns into a traditional FRM which is amortized over the remaining term (in this case, 27 years) at the 7.0% rate. This is shown in Year 4 where the PRIN-EOP becomes the PV, and the rate, term residual translate to a \$1,632 monthly payment. At this point, the PRIN-EOP begins to decline by the AMORT until the loan is fully paid at the end of the term. If the loan is prepaid, the PRIN-EOP must be paid in full.

As noted at the bottom of Table 21, once the STEP phases have been completed, the amortization period begins. If it is held full term, the PRIN-EOP should equal zero at the end of the 30 years. If it is prepaid, the borrower must make the full payment.

GPM Yields

Table 22 (a): GPM Yields, Full Term, No Points

Year	Total PMT	INT	AMORT	P-EOP
-224000				
1	\$11,200	\$11,200	\$ -	\$228,952
2	\$11,872	\$11,872	\$ -	\$233,499
3	\$12,584	\$12,584	\$ -	\$237,270
4	\$19,584	\$16,512	\$ 3,072	\$234,198
5	\$19,584	\$16,289	\$ 3,294	\$230,904
6	\$19,584	\$16,051	\$ 3,532	\$227,371
7	\$19,584	\$15,796	\$ 3,788	\$223,584
8	\$19,584	\$15,522	\$ 4,062	\$219,522
9	\$19,584	\$15,229	\$ 4,355	\$215,167
10	\$19,584	\$14,914	\$ 4,670	\$210,497
11	\$19,584	\$14,576	\$ 5,008	\$205,489
12	\$19,584	\$14,214	\$ 5,370	\$200,120
13	\$19,584	\$13,826	\$ 5,758	\$194,362
14	\$19,584	\$13,410	\$ 6,174	\$188,188
15	\$19,584	\$12,963	\$ 6,620	\$181,567
16	\$19,584	\$12,485	\$ 7,099	\$174,469
17	\$19,584	\$11,972	\$ 7,612	\$166,856
18	\$19,584	\$11,421	\$ 8,162	\$158,694
19	\$19,584	\$10,831	\$ 8,752	\$149,942
20	\$19,584	\$10,199	\$ 9,385	\$140,556
21	\$19,584	\$9,520	\$ 10,064	\$130,493
22	\$19,584	\$8,793	\$ 10,791	\$119,702
23	\$19,584	\$8,013	\$ 11,571	\$108,131
24	\$19,584	\$7,176	\$ 12,408	\$95,723
25	\$19,584	\$6,279	\$ 13,305	\$82,418
26	\$19,584	\$5,317	\$ 14,266	\$68,152
27	\$19,584	\$4,286	\$ 15,298	\$52,854
28	\$19,584	\$3,180	\$ 16,404	\$36,450
29	\$19,584	\$1,994	\$ 17,589	\$18,861
30	\$19,574	\$723	\$ 18,861	\$0

IRR

Annual	6.95%
Monthly	7.02%

APR

Annual	7.00%
Monthly	7.00%

As expected, the GPM does not affect the IRR to the lender on a monthly basis. However, due to slight differences in FV compounding, the IRR may be off due to rounding.

Table 22 (b): GPM Yields, 10 year Hold, No Points

Year	Total PMT	INT	AMORT	P-EOP
-224000				
1	\$11,200	\$11,200	\$ -	\$228,952
2	\$11,872	\$11,872	\$ -	\$233,499
3	\$12,584	\$12,584	\$ -	\$237,270
4	\$19,584	\$16,512	\$ 3,072	\$234,198
5	\$19,584	\$16,289	\$ 3,294	\$230,904
6	\$19,584	\$16,051	\$ 3,532	\$227,371
7	\$19,584	\$15,796	\$ 3,788	\$223,584
8	\$19,584	\$15,522	\$ 4,062	\$219,522
9	\$19,584	\$15,229	\$ 4,355	\$215,167
10	\$228,850	\$14,914	\$ 215,167	\$0

IRR

Annual	6.98%
Monthly	7.03%

Once again, with a 10 year hold and no discounts, points or prepayments, the yield is 7%, the GPM rates.

APR

Annual	7.00%
Monthly	7.00%

Table 22 (c): GPM Yields, 5 Year Hold, Points and Prepayment

Year	Total PMT	INT	AMORT	P-EOP
-215040				
1	\$11,200	\$11,200	\$ -	\$228,952
2	\$11,872	\$11,872	\$ -	\$233,499
3	\$12,584	\$12,584	\$ -	\$237,270
4	\$19,584	\$16,512	\$ 3,072	\$234,198
5	\$249,139	\$16,289	\$ 234,198	\$0

IRR

Annual	7.94%
Monthly	7.99%

With a 5 year hold, points and penalty, the APR increases to 8.0% as a result of the extra charges.

APR

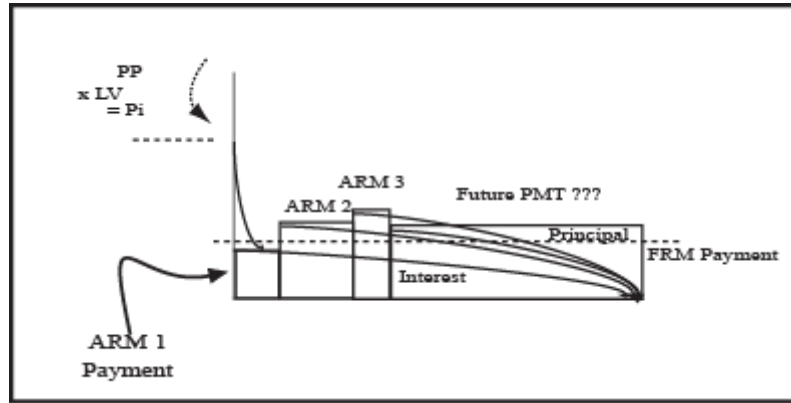
Annual	8.00%
Monthly	8.00%

Adjustable Rate Mortgages (ARM)

Overview

An Adjustable Rate Mortgage is a mortgage arrangement in which the borrower accepts interest rate risk, with payments rising or falling depending on changes in some benchmark index. In return for the added risk, the lender typically offers ARMs at slightly lower rates to “entice” borrowers seeking to

lower their mortgage payments or to “stretch” their Mortgage Capture potential. In an ARM, the earned rate of interest will be reset at fixed time periods and then remain constant until the next scheduled adjustment period. There are three major options for treating changes in interest rates: adjusting the monthly payment; extending the term of the loan at constant payments; or, maintaining payments and term but increasing the outstanding principal balance. To protect the borrower from excessive payment risk, the change per step and the cumulative change for the entire loan may be capped. In some arrangements, the amount that would have been “earned” over the cap is written off, while in other arrangements the “pay rate” is capped and the residual between the paid rate and earned rate is compounded forward as negative amortization.



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ARM Base Case

Table 23 (a): ARM Base Case

Traditional Mortgage		Code
Purchase Price	\$ 280,000	PP
Mortgage Terms		
Loan-to-Value	80%	LV
Rate	6.50%	Mi
Term	30	t
Periodicity	12	N
Mortgage Fees		
Origination Fee	1%	Fee0
Points	2%	Pts
Prepayment Penalty	2%	PP
Equity Capital		
Mortgage Capture Ratio	28%	MCR
Expected Holding Period	5	E(HP)
Cost of Capital	10%	Ec

To understand the ARM loan, it is useful to position it against the Traditional FRM. Thus, the base case assumptions are the same; the difference will reside in the change in interest rates which will affect the pattern of payments and the yield.

Sources of Capital		Code
Initial Principal	\$ 224,000	Pi
Initial Equity	\$ 56,000	Ei
Total Capital	\$ 280,000	Tcap

Table 23 (b): ARM Steps

ARM Steps		
Steps		Cum Steps
Step 1		1
Step 2		2
Step 3		4
VRM Rates		
Initial VRM Discount	-0.50%	
Initial Rate		6.00%
Rate Pattern: Increase/Decrease	Indexed Change	Rate
Step 1		6.00%
Step 2	1.50%	7.50%
Step 3	2%	9.50%
Remainder of Term	-1%	8.50%

As noted in Table 23 (b), the ARM we are looking at has three resets with no Caps or ceilings per reset or for the life of the loan. In some ARMs, there would be maximum changes for each of these items to protect the borrower from payment shock. We will not explore these options here, but they will often be encountered. Using the basic framework in this primer, you should be able to model these constraints. Note however, that it will be important to realize whether the caps --if any-- are payment caps or earned caps. That is, the mortgage could have a

maximum change per reset, but could still earn at the higher rate for the benchmark. The differences would be compounded forward, creating a period of negative amortization which would protect the lender's yield. If the cap is on the "earned rate," the lender would merely forego the gap and live with capped rate of return regardless of what the benchmark index might otherwise allow.

In this case, we are dealing with a capped earned rate with the presumed pattern. The rate will start out below our FRM of 6.5% as an inducement to attract the borrower. From there, our "crystal ball" suggests a likely scenario would be for rates to rise for two periods by the

ARM Visualization: Cash Flows and Principal Balances

Exhibit 13 (a): ARM Cash Flows

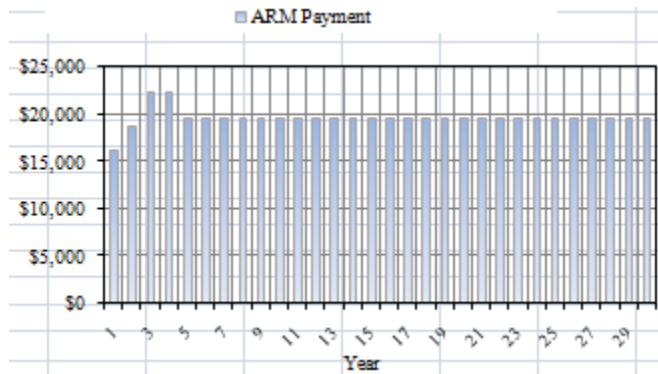


Exhibit 13 (b): ARM Principal Balances

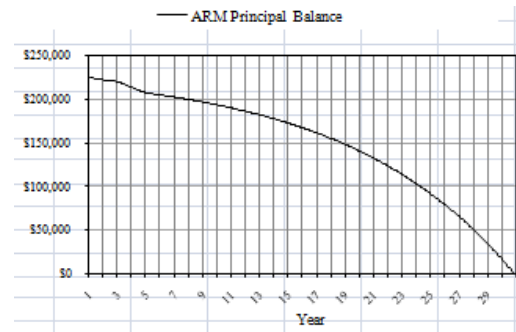


Table 24: ARM Steps; 2 Step, 4 year Hold

ARM Mechanics

Year	Mo	PRIN BOP	PMT/Step	INT	P-AMORT	Prin EOP
			(\$224,000)			
1	1	\$224,000	\$1,343	\$1,120	\$223	\$223,777
1	2	\$223,777	\$1,343	\$1,119	\$224	\$223,553
1	3	\$223,553	\$1,343	\$1,118	\$225	\$223,328
1	4	\$223,328	\$1,343	\$1,117	\$226	\$223,101
1	5	\$223,101	\$1,343	\$1,116	\$227	\$222,874
1	6	\$222,874	\$1,343	\$1,114	\$229	\$222,645
1	7	\$222,645	\$1,343	\$1,113	\$230	\$222,415
1	8	\$222,415	\$1,343	\$1,112	\$231	\$222,185
1	9	\$222,185	\$1,343	\$1,111	\$232	\$221,952
1	10	\$221,952	\$1,343	\$1,110	\$233	\$221,719
1	11	\$221,719	\$1,343	\$1,109	\$234	\$221,485
1	12	\$221,485	\$1,343	\$1,107	\$236	\$221,249
2	13	\$221,249	\$1,561	\$1,383	\$179	\$221,071
2	14	\$221,071	\$1,561	\$1,382	\$180	\$220,891
2	15	\$220,891	\$1,561	\$1,381	\$181	\$220,710
2	16	\$220,710	\$1,561	\$1,379	\$182	\$220,528
2	17	\$220,528	\$1,561	\$1,378	\$183	\$220,345
2	18	\$220,345	\$1,561	\$1,377	\$184	\$220,161
2	19	\$220,161	\$1,561	\$1,376	\$185	\$219,975
2	20	\$219,975	\$1,561	\$1,375	\$187	\$219,789
2	21	\$219,789	\$1,561	\$1,374	\$188	\$219,601
2	22	\$219,601	\$1,561	\$1,373	\$189	\$219,412
2	23	\$219,412	\$1,561	\$1,371	\$190	\$219,222
2	24	\$219,222	\$1,561	\$1,370	\$191	\$219,031
3	25	\$219,031	\$1,711	\$1,551	\$160	\$218,871
3	26	\$218,871	\$1,711	\$1,550	\$161	\$218,710
3	27	\$218,710	\$1,711	\$1,549	\$162	\$218,548
3	28	\$218,548	\$1,711	\$1,548	\$163	\$218,385
3	29	\$218,385	\$1,711	\$1,547	\$164	\$218,221
3	30	\$218,221	\$1,711	\$1,546	\$165	\$218,056
3	31	\$218,056	\$1,711	\$1,545	\$167	\$217,889
3	32	\$217,889	\$1,711	\$1,543	\$168	\$217,721
3	33	\$217,721	\$1,711	\$1,542	\$169	\$217,552
3	34	\$217,552	\$1,711	\$1,541	\$170	\$217,382
3	35	\$217,382	\$1,711	\$1,540	\$171	\$217,211
3	36	\$217,211	\$1,711	\$1,539	\$173	\$217,038
4	37	\$217,038	\$1,711	\$1,537	\$174	\$216,864
4	38	\$216,864	\$1,711	\$1,536	\$175	\$216,689
4	39	\$216,689	\$1,711	\$1,535	\$176	\$216,513
4	40	\$216,513	\$1,711	\$1,534	\$178	\$216,335
4	41	\$216,335	\$1,711	\$1,532	\$179	\$216,157
4	42	\$216,157	\$1,711	\$1,531	\$180	\$215,976
4	43	\$215,976	\$1,711	\$1,530	\$181	\$215,795
4	44	\$215,795	\$1,711	\$1,529	\$183	\$215,612
4	45	\$215,612	\$1,711	\$1,527	\$184	\$215,429
4	46	\$215,429	\$1,711	\$1,526	\$185	\$215,243
4	47	\$215,243	\$1,711	\$1,525	\$187	\$215,057
4	48	\$215,057	\$216,580	\$1,523	\$215,057	\$0
5	49	\$0	\$0	\$0	\$0	\$0

To simplify the discussion and make it easier to follow, Table 24 presents that ARM pattern for a loan with 2 steps at the 6% and 7.5% rates per Table 23 (b), but then skips the third step and goes to a fully amortizing loan for the balance. The example also has a repayment at the end of the 4th year.

If the loan were held for the full 30 years, this last payment would amortize it over the remaining 28 years.

ARM Yields

Table 25 (a): ARM Yields, Full Term, No Points

Year	PMT	INT	AMORT	P-EOP
	(\$224,000)			
1	\$16,116	\$2,751	\$13,365	\$221,249
2	\$18,737	\$2,218	\$16,518	\$219,031
3	\$22,391	\$6,173	\$16,218	\$212,858
4	\$22,391	\$6,652	\$15,739	\$206,206
5	\$19,706	\$2,266	\$17,441	\$203,941
6	\$19,706	\$2,466	\$17,240	\$201,475
7	\$19,706	\$2,684	\$17,022	\$198,791
8	\$19,706	\$2,921	\$16,785	\$195,870
9	\$19,706	\$3,179	\$16,527	\$192,691
10	\$19,706	\$3,460	\$16,246	\$189,231
11	\$19,706	\$3,766	\$15,940	\$185,464
12	\$19,706	\$4,099	\$15,607	\$181,365
13	\$19,706	\$4,461	\$15,245	\$176,904
14	\$19,706	\$4,856	\$14,851	\$172,048
15	\$19,706	\$5,285	\$14,421	\$166,764
16	\$19,706	\$5,752	\$13,954	\$161,012
17	\$19,706	\$6,260	\$13,446	\$154,751
18	\$19,706	\$6,814	\$12,892	\$147,937
19	\$19,706	\$7,416	\$12,290	\$140,521
20	\$19,706	\$8,072	\$11,635	\$132,450
21	\$19,706	\$8,785	\$10,921	\$123,665
22	\$19,706	\$9,562	\$10,145	\$114,103
23	\$19,706	\$10,407	\$9,300	\$103,696
24	\$19,706	\$11,327	\$8,380	\$92,370
25	\$19,706	\$12,328	\$7,379	\$80,042
26	\$19,706	\$13,417	\$6,289	\$66,625
27	\$19,706	\$14,603	\$5,103	\$52,021
28	\$19,706	\$15,894	\$3,812	\$36,127
29	\$19,706	\$17,299	\$2,407	\$18,828
30	\$19,706	\$18,828	\$878	\$0
IRR Calculations				
Annual	7.90%			
Monthly	7.99%			

Exhibit 25 (a) goes back to the base case assumptions with the 3 steps and residual cash flows. As noted in the table, if the ARM is held full term, the monthly IRR is 8.15% which is the blended rate between the initial pay rate and the stepped rates.

Table 25 (b): ARM Yields, Points and Prepayment Penalty, 10 year Hold

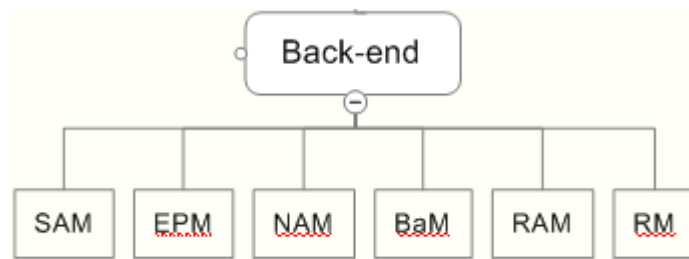
Year	PMT	INT	AMORT	P-EOP
	(\$217,280)			
1	\$16,116	\$2,751	\$13,365	\$221,249
2	\$18,737	\$2,218	\$16,518	\$219,031
3	\$22,391	\$6,173	\$16,218	\$212,858
4	\$22,391	\$6,652	\$15,739	\$206,206
5	\$227,730	\$206,206	\$17,441	\$0
6	\$0	\$0	\$0	\$0
IRR Calculations				
Annual	8.34%			
Monthly	8.37%			

Back-end Mortgages

Introduction

This class of mortgages is juxtaposed against the Front-end Mortgages, impacting on the Residual Principal Balance that is left at the end of the holding period (i.e., time from inception to termination or repayment) or the term if the mortgage is held to maturity. The general class of “Back-end Mortgages” includes SAMs and EPMs, NAMs, BaMs, RAMs, and RMs. In general, these products result in an increase or partial reduction in mortgage balances, or the addition of an equity “kicker” or sharing of the Net Terminal Value upon sale or termination. As noted in several of the prior plans, any mortgage that affects the principal balance outstanding at the end of a holding period could be included in this general group. However, the key element to the differentiation of this type of mortgage from the others is that they are clearly marketed as forms of equity participation loans.

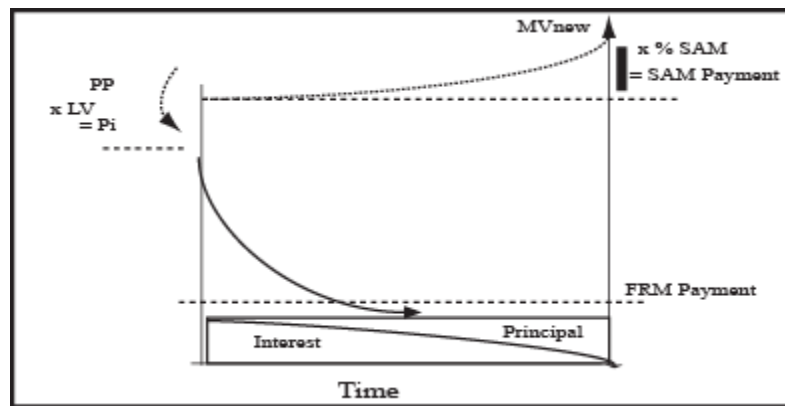
Exhibit 14: Typology of Back-end Mortgages



Shared Appreciation Mortgages (SAM) & Equity Participation Mortgages (EPM)

Overview

In a Shared Appreciation Mortgage, the borrower gives up a portion of the potential appreciation that occur over time in return for lower mortgage interest rate. This option provides a lender upside potential whereby they can capture some of the equity benefits without incurring the risks. In the case a property does not appreciate, the lender merely foregoes the potential upside and relies on the contract interest rate for compensation. On the other hand, if the property increases in value, the lender will be eligible to receive a pre-specified proportion of the gains after selling expenses and other charges are deducted. The arrangement can be used to help the borrower qualify for a loan and reduce periodic mortgage payments. To provide some certainty to the arrangement, the appreciation kicker will be paid upon sale of the

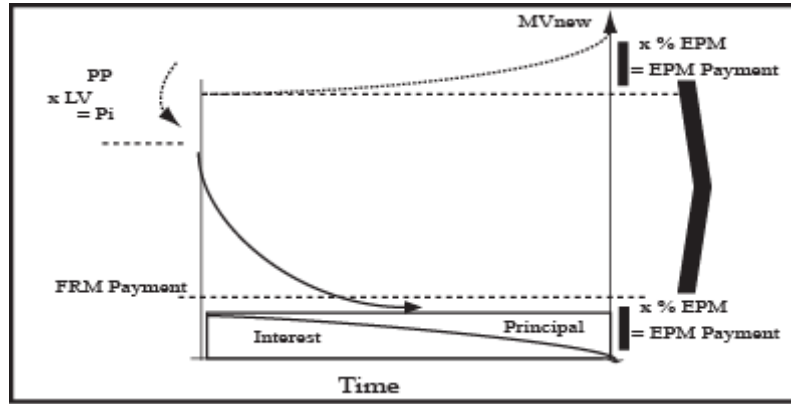


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property or, depending on negotiations, at some predetermined time periods. In the latter option, the property would be appraised to determine the “earned” equity kicker due to the lender. This amount can be paid in cash, or can be rolled into the mortgage balance creating an additional residual claim.

Overview of EPM

An Equity Participation Mortgage is similar to a SAM, with the major difference being the fact the borrower gives up portion of their equity build-up amortization at the time of inception. This equity position and combined with the appreciation component to determine the aggregate equity kicker. As with the SAM, the EPM settlement would occur upon sale, or at pre-specified periods. Depending on the contractual



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agreement, the proceeds from interim re-sets could be paid in cash or rolled into the mortgage. If they are added to the principal balance, the term could be extended, payments could increase, or the loan could flip to a partially amortizing loan with a balance due upon termination.

Since the two mortgages are similar, they can be best illustrated in a common case.

SAM/EPM Base Case

Table 26 (a): SAM/EPM Base Case

Traditional Mortgage			Code
Purchase Price		\$ 280,000	PP
Mortgage Terms			
Loan-to-Value		80%	LV
Rate		6.50%	Mi
Term		30	t
Periodicity		12	N
Mortgage Fees			
Origination Fee			FeeO
Points			Pts
Prepayment Penalty		1%	PP
Equity Capital			
Mortgage Capture Ratio		28%	MCR
Expected Holding Period		10	E(HP)
Cost of Capital		10%	Ec

Sources of Capital			Code
Initial Principal		\$ 224,000	Pi
Initial Equity		\$ 56,000	Ei
Total Capital		\$ 280,000	Tcap

Table 26 (b): SAM/EPM Structure

Lender Participation		
SAM/EPM Rate		
Discount for Participation		1.00%
SAM/EPM Interest Rate		6.00%
Shared Appreciation		20%
Equity Participation		15%
Change in Market Value		
Appreciation		2%
Periodicity		12

As noted in the table, the lender is entitled to a percentage of the Appreciation in the SAM, and a percentage of the Equity Participation (i.e., Appreciation plus Amortization) in the EPM.

SAM/EPM Visualization: Cash Flows and Principal Balances

Exhibit 15 (a): SAM/EPM Cash Flows

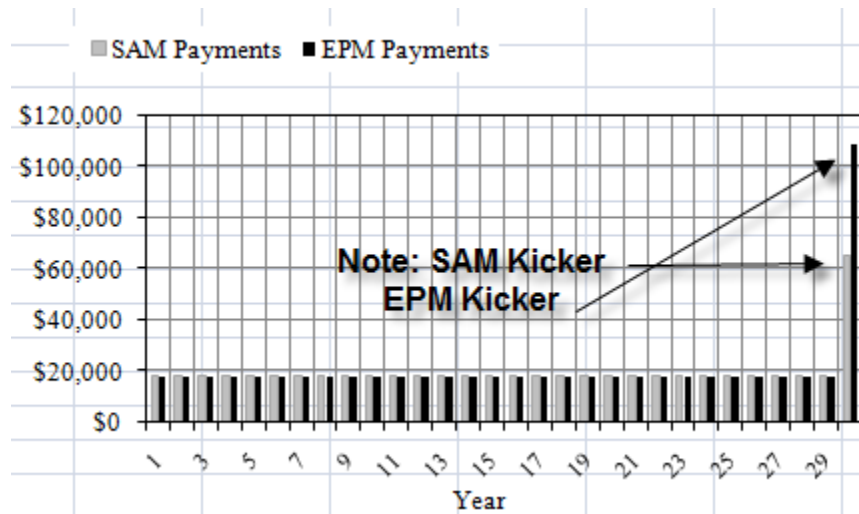
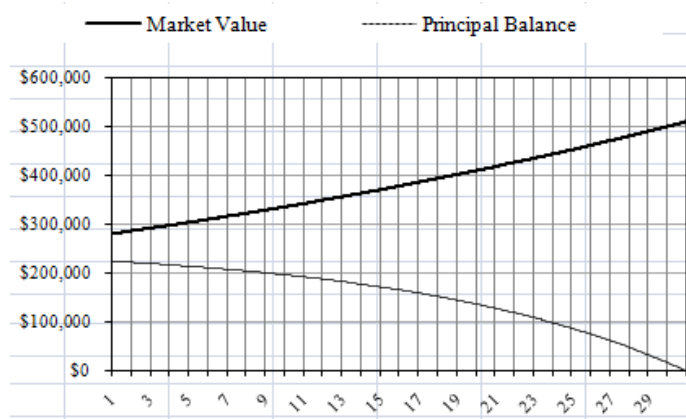


Exhibit 15 (a) plots out the actual payment patterns for the SAM and EPM generated by our base case.

Exhibit 15 (b): SAM/EPM Principal Balance and Market Value



SAM/EPM Mechanics

Table 27 (a): SAM/EPM Mechanics

Mkt Value	Year	Mo	PRIN BOP	PMT	INT	AMORT	Prin EOP	APPREC	APP+AMORT	Earned Share		Paid Share	
										SAM @ 15%	EPM	SAM	EPM
\$280,000	1	1	\$224,000	\$1,416	\$1,213	\$ 202.50	\$223,798	\$0	\$202	\$0	\$40	\$0	\$0
\$280,467	1	2	\$223,798	\$1,416	\$1,212	\$ 203.60	\$223,594	\$467	\$873	\$93	\$175	\$0	\$0
\$280,934	1	3	\$223,594	\$1,416	\$1,211	\$ 204.70	\$223,389	\$934	\$1,545	\$187	\$309	\$0	\$0
\$281,402	1	4	\$223,389	\$1,416	\$1,210	\$ 205.81	\$223,183	\$1,402	\$2,219	\$280	\$444	\$0	\$0
\$281,871	1	5	\$223,183	\$1,416	\$1,209	\$ 206.92	\$222,976	\$1,871	\$2,895	\$374	\$579	\$0	\$0
\$282,341	1	6	\$222,976	\$1,416	\$1,208	\$ 208.04	\$222,768	\$2,341	\$3,573	\$468	\$715	\$0	\$0
\$282,812	1	7	\$222,768	\$1,416	\$1,207	\$ 209.17	\$222,559	\$2,812	\$4,252	\$562	\$850	\$0	\$0
\$283,283	1	8	\$222,559	\$1,416	\$1,206	\$ 210.30	\$222,349	\$3,283	\$4,934	\$657	\$987	\$0	\$0
\$283,755	1	9	\$222,349	\$1,416	\$1,204	\$ 211.44	\$222,138	\$3,755	\$5,618	\$751	\$1,124	\$0	\$0
\$284,228	1	10	\$222,138	\$1,416	\$1,203	\$ 212.59	\$221,925	\$4,228	\$6,303	\$846	\$1,261	\$0	\$0
\$284,702	1	11	\$221,925	\$1,416	\$1,202	\$ 213.74	\$221,711	\$4,702	\$6,991	\$940	\$1,398	\$0	\$0
\$285,176	1	12	\$221,711	\$1,416	\$1,201	\$ 214.90	\$221,496	\$5,176	\$7,680	\$1,035	\$1,536	\$0	\$0
\$285,652	2	13	\$221,496	\$1,416	\$1,200	\$ 216.06	\$221,280	\$5,652	\$8,371	\$1,130	\$1,674	\$0	\$0
\$286,128	2	14	\$221,280	\$1,416	\$1,199	\$ 217.23	\$221,063	\$6,128	\$9,065	\$1,226	\$1,813	\$0	\$0
\$286,605	2	15	\$221,063	\$1,416	\$1,197	\$ 218.41	\$220,845	\$6,605	\$9,760	\$1,321	\$1,952	\$0	\$0
\$287,082	2	16	\$220,845	\$1,416	\$1,196	\$ 219.59	\$220,625	\$7,082	\$10,457	\$1,416	\$2,091	\$0	\$0
\$287,561	2	17	\$220,625	\$1,416	\$1,195	\$ 220.78	\$220,404	\$7,561	\$11,155	\$1,512	\$2,231	\$0	\$0
\$288,040	2	18	\$220,404	\$1,416	\$1,194	\$ 221.98	\$220,182	\$8,040	\$11,858	\$1,608	\$2,372	\$0	\$0
\$288,520	2	19	\$220,182	\$1,416	\$1,193	\$ 223.18	\$219,959	\$8,520	\$12,561	\$1,704	\$2,512	\$0	\$0
\$289,001	2	20	\$219,959	\$1,416	\$1,191	\$ 224.39	\$219,735	\$9,001	\$13,266	\$1,800	\$2,653	\$0	\$0
\$289,483	2	21	\$219,735	\$1,416	\$1,190	\$ 225.60	\$219,509	\$9,483	\$13,974	\$1,897	\$2,795	\$0	\$0
\$289,965	2	22	\$219,509	\$1,416	\$1,189	\$ 226.82	\$219,282	\$9,965	\$14,683	\$1,993	\$2,937	\$0	\$0
\$290,448	2	23	\$219,282	\$1,416	\$1,188	\$ 228.05	\$219,054	\$10,448	\$15,394	\$2,090	\$3,079	\$0	\$0
\$290,932	2	24	\$219,054	\$1,416	\$1,187	\$ 229.29	\$218,825	\$10,932	\$16,108	\$2,186	\$3,222	\$0	\$0
\$291,417	3	25	\$218,825	\$1,416	\$1,185	\$ 230.53	\$218,594	\$11,417	\$16,823	\$2,283	\$3,365	\$0	\$0

As noted, to calculate the earned shares, the Market Value of the property must be carried forward. With a 2% growth rate, the MV grows from \$280,000 to \$291,437 over the 2 years in the excerpt above.

Table 27 (b): SAM/EPM Payouts if Full Term

\$499,849	30	349	\$16,407	\$1,416	\$89	\$1,326.96	\$15,080	\$219,849	\$428,770	\$43,970	\$85,754	\$0	\$0
\$500,682	30	350	\$15,080	\$1,416	\$82	\$1,334.15	\$13,746	\$220,682	\$430,937	\$44,136	\$86,187	\$0	\$0
\$501,517	30	351	\$13,746	\$1,416	\$74	\$1,341.38	\$12,404	\$221,517	\$433,113	\$44,303	\$86,623	\$0	\$0
\$502,353	30	352	\$12,404	\$1,416	\$67	\$1,348.64	\$11,055	\$222,353	\$435,297	\$44,471	\$87,059	\$0	\$0
\$503,190	30	353	\$11,055	\$1,416	\$60	\$1,355.95	\$9,700	\$223,190	\$437,491	\$44,638	\$87,498	\$0	\$0
\$504,029	30	354	\$9,700	\$1,416	\$53	\$1,363.29	\$8,336	\$224,029	\$439,692	\$44,806	\$87,938	\$0	\$0
\$504,869	30	355	\$8,336	\$1,416	\$45	\$1,370.68	\$6,966	\$224,869	\$441,903	\$44,974	\$88,381	\$0	\$0
\$505,710	30	356	\$6,966	\$1,416	\$38	\$1,378.10	\$5,587	\$225,710	\$444,123	\$45,142	\$88,825	\$0	\$0
\$506,553	30	357	\$5,587	\$1,416	\$30	\$1,385.57	\$4,202	\$226,553	\$446,351	\$45,311	\$89,270	\$0	\$0
\$507,397	30	358	\$4,202	\$1,416	\$23	\$1,393.07	\$2,809	\$227,397	\$448,588	\$45,479	\$89,718	\$0	\$0
\$508,243	30	359	\$2,809	\$1,416	\$15	\$1,400.62	\$1,408	\$228,243	\$450,835	\$45,649	\$90,167	\$0	\$0
\$509,090	30	360	\$1,408	\$1,416	\$8	\$1,408.20	\$0	\$229,090	\$450,274	\$45,818	\$90,055	\$45,818	\$90,055

It should be noted that the lender will not get the “kicker” under each loan until it is retired. In some cases, the contract could call for a reset at some fixed point in time, say the 10th year, which would provide a lump-sum payment but would keep the mortgage intact.

SAM/EPM Yields

Table 28 (a): SAM/EPM Yields, Full Term, No Points

Year	PMT	INT	AMORT	PRIN EOP	SAM-SH	EPM-SH	SAM	EPM
	\$ (224,000)						\$ (224,000)	\$ (224,000)
1	\$16,116	\$14,486	\$2,504	\$221,496	\$0	\$0	\$16,116	\$16,116
2	\$16,116	\$14,319	\$2,671	\$218,825	\$0	\$0	\$16,116	\$16,116
3	\$16,116	\$14,140	\$2,850	\$215,975	\$0	\$0	\$16,116	\$16,116
4	\$16,116	\$13,949	\$3,041	\$212,933	\$0	\$0	\$16,116	\$16,116
5	\$16,116	\$13,745	\$3,245	\$209,689	\$0	\$0	\$16,116	\$16,116
6	\$16,116	\$13,528	\$3,462	\$206,226	\$0	\$0	\$16,116	\$16,116
7	\$16,116	\$13,296	\$3,694	\$202,532	\$0	\$0	\$16,116	\$16,116
8	\$16,116	\$13,049	\$3,941	\$198,591	\$0	\$0	\$16,116	\$16,116
9	\$16,116	\$12,785	\$4,205	\$194,386	\$0	\$0	\$16,116	\$16,116
10	\$16,116	\$12,503	\$4,487	\$189,899	\$0	\$0	\$16,116	\$16,116
11	\$16,116	\$12,202	\$4,788	\$185,111	\$0	\$0	\$16,116	\$16,116
12	\$16,116	\$11,882	\$5,108	\$180,003	\$0	\$0	\$16,116	\$16,116
13	\$16,116	\$11,540	\$5,450	\$174,553	\$0	\$0	\$16,116	\$16,116
14	\$16,116	\$11,175	\$5,815	\$168,737	\$0	\$0	\$16,116	\$16,116
15	\$16,116	\$10,785	\$6,205	\$162,532	\$0	\$0	\$16,116	\$16,116
16	\$16,116	\$10,370	\$6,620	\$155,912	\$0	\$0	\$16,116	\$16,116
17	\$16,116	\$9,926	\$7,064	\$148,849	\$0	\$0	\$16,116	\$16,116
18	\$16,116	\$9,453	\$7,537	\$141,312	\$0	\$0	\$16,116	\$16,116
19	\$16,116	\$8,948	\$8,041	\$133,270	\$0	\$0	\$16,116	\$16,116
20	\$16,116	\$8,410	\$8,580	\$124,690	\$0	\$0	\$16,116	\$16,116
21	\$16,116	\$7,835	\$9,155	\$115,536	\$0	\$0	\$16,116	\$16,116
22	\$16,116	\$7,222	\$9,768	\$105,768	\$0	\$0	\$16,116	\$16,116
23	\$16,116	\$6,568	\$10,422	\$95,346	\$0	\$0	\$16,116	\$16,116
24	\$16,116	\$5,870	\$11,120	\$84,226	\$0	\$0	\$16,116	\$16,116
25	\$16,116	\$5,125	\$11,865	\$72,361	\$0	\$0	\$16,116	\$16,116
26	\$16,116	\$4,331	\$12,659	\$59,702	\$0	\$0	\$16,116	\$16,116
27	\$16,116	\$3,483	\$13,507	\$46,195	\$0	\$0	\$16,116	\$16,116
28	\$16,116	\$2,578	\$14,412	\$31,783	\$0	\$0	\$16,116	\$16,116
29	\$16,116	\$1,613	\$15,377	\$16,407	\$0	\$0	\$16,116	\$16,116
30	\$16,189	\$583	\$16,407	\$0	\$45,818	\$90,055	\$62,007	\$106,243
IRRs								
Annual	5.91%					Annual	6.23%	6.50%
Monthly	6.00%							

Thus, if the loan goes full term, the lender makes the current FRM rate.

Table 28 (b): SAM/EPM Yields, Points and Prepayment, 10 year Hold

Year	PMT	INT	AMORT	PRIN EOP	SAM-SH	EPM-SH	SAM	EPM
	\$ (217,280)						\$ (217,280)	\$ (217,280)
1	\$16,116	\$14,486	\$2,504	\$221,496	\$0	\$0	\$16,116	\$16,116
2	\$16,116	\$14,319	\$2,671	\$218,825	\$0	\$0	\$16,116	\$16,116
3	\$16,116	\$14,140	\$2,850	\$215,975	\$0	\$0	\$16,116	\$16,116
4	\$16,116	\$13,949	\$3,041	\$212,933	\$0	\$0	\$16,116	\$16,116
5	\$16,116	\$13,745	\$3,245	\$209,689	\$0	\$0	\$16,116	\$16,116
6	\$16,116	\$13,528	\$3,462	\$206,226	\$0	\$0	\$16,116	\$16,116
7	\$16,116	\$13,296	\$3,694	\$202,532	\$0	\$0	\$16,116	\$16,116
8	\$16,116	\$13,049	\$3,941	\$198,591	\$0	\$0	\$16,116	\$16,116
9	\$16,116	\$12,785	\$4,205	\$194,386	\$0	\$0	\$16,116	\$16,116
10	\$209,893	\$12,503	\$194,386	\$0	\$12,273	\$19,040	\$222,166	\$228,933
11	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
12	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
13	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
14	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
15	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
16	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
17	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
18	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
19	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
20	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
21	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
22	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
23	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
24	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
25	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
26	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
27	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
28	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
29	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
30	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
IRRs								
Annual	6.62%					Annual	7.04%	7.27%
Monthly	6.65%							

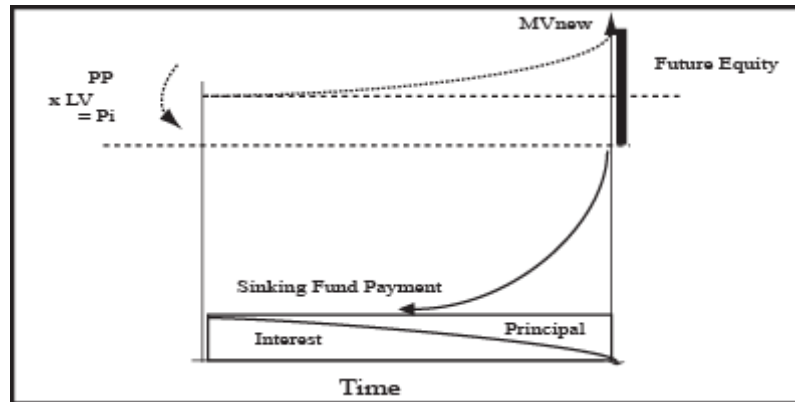
As with the other mortgages, the yields are amplified with a shorter hold and fees and penalties.

Reverse Mortgages (RM)

Overview

The Reverse Mortgage addresses the same needs as RAM, although the approach significantly different. Rather than advancing the agreed-to sum up front, the future amount of the mortgage value specified. This amount is based on application of some LV ratio to the current market value, with possible adjustments based on the quality of the property and financial situation of the borrower which might provide additional protection against loss. Once the future value is set, the sinking fund or annuity payment that could be drawn off is determined. This sinking fund is then compounded forward at the specified mortgage interest rate, creating an increasing claim against the collateral.

Assuming the house holds its value, at the end of the term the LV ratio matches the initial agreement. In most cases, however, the house would be expected to appreciate in value, thus providing an additional cushion to cover repayment. If the borrower wishes to retain ownership, the mortgage can be refinanced or otherwise recapitalized.



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RM Base Case

Table 29: RM Base Case

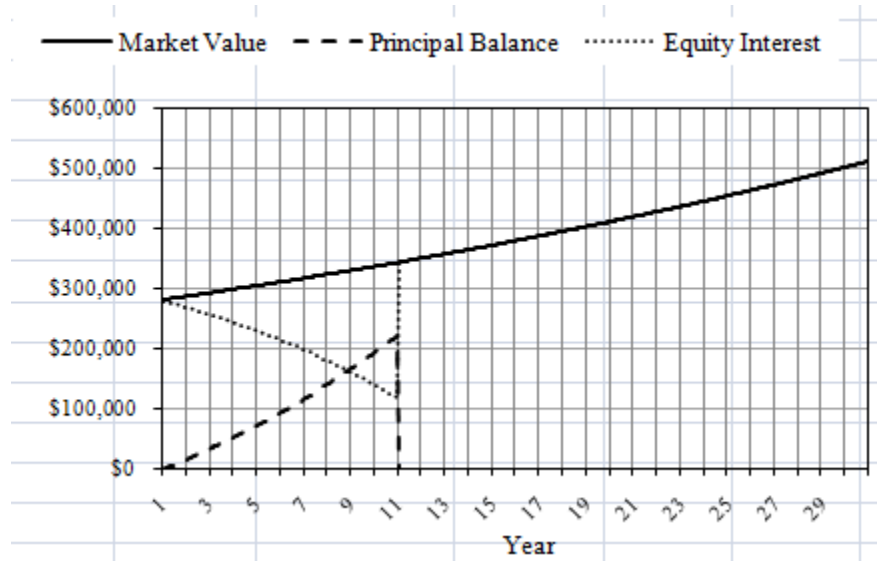
Reverse Mortgage			Code
Current Market Value	\$ 280,000		PP
Mortgage Terms			
Forward LV Commitment	80%		LV
Rate	6.50%		Mi
Term	10		t
Periodicity	12		N
Mortgage Fees			
Origination Fee	2%		Fee0
Points	1%		Pts
Prepayment Penalty	1%		PP
Equity Capital			
Mortgage Capture Ratio	28%		MCR
Expected Holding Period	5		E(HP)
Cost of Capital	10%		E _c

Table 29 (b): RM Capital Structure

Sources of Capital		Code
Future Value Commitment	\$224,000	Pi
Initial Equity	\$280,000	Ei
Total Capital	\$ -	Tcap
Change in Market Value		
Appreciation	2%	
Periodicity	12	

RM Visualization: Cash Flows and Principal Balances

Exhibit 16: RM Principal Balances



As noted in the plot, the RM is really a forward commitment for the current justified loan applying the LV of 80% to the current Market Value. In reality, the MV will grow as in our scenario, thus decreasing the implicit LV ratio. Also, the borrower is making no payments, but is on the receiving end of a sinking fund which will accumulate to the target sum at the end of the term. At that point, the arrangement could be extended.

RM Mechanics

Table 30 (a): RM Mechanics

Mkt Value	Year	Mo	PRIN BOP	PMT	PRIN EOP	FV EOP	LV-Current	LV-FMV	Equity \$
\$280,000	1	1	\$0	\$1,330	\$1,330	\$1,330	0.5%	0.5%	\$278,670
\$280,467	1	2	\$1,330	\$1,330	\$2,660	\$2,667	1.0%	1.0%	\$277,806
\$280,934	1	3	\$2,667	\$1,330	\$3,998	\$4,012	1.4%	1.4%	\$276,936
\$281,402	1	4	\$4,012	\$1,330	\$5,342	\$5,364	1.9%	1.9%	\$276,060
\$281,871	1	5	\$5,364	\$1,330	\$6,694	\$6,723	2.4%	2.4%	\$275,177
\$282,341	1	6	\$6,723	\$1,330	\$8,053	\$8,090	2.9%	2.9%	\$274,288
\$282,812	1	7	\$8,090	\$1,330	\$9,420	\$9,464	3.4%	3.3%	\$273,392
\$283,283	1	8	\$9,464	\$1,330	\$10,794	\$10,845	3.9%	3.8%	\$272,489
\$283,755	1	9	\$10,845	\$1,330	\$12,175	\$12,234	4.4%	4.3%	\$271,580
\$284,228	1	10	\$12,234	\$1,330	\$13,564	\$13,630	4.9%	4.8%	\$270,664
\$284,702	1	11	\$13,630	\$1,330	\$14,961	\$15,034	5.4%	5.3%	\$269,741
\$285,176	1	12	\$15,034	\$1,330	\$16,364	\$16,446	5.9%	5.8%	\$268,812
\$285,652	2	13	\$16,446	\$1,330	\$17,776	\$17,865	6.4%	6.3%	\$267,876
\$286,128	2	14	\$17,865	\$1,330	\$19,195	\$19,292	6.9%	6.7%	\$266,932
\$286,605	2	15	\$19,292	\$1,330	\$20,622	\$20,727	7.4%	7.2%	\$265,982
\$287,082	2	16	\$20,727	\$1,330	\$22,057	\$22,169	7.9%	7.7%	\$265,025
\$287,561	2	17	\$22,169	\$1,330	\$23,499	\$23,619	8.4%	8.2%	\$264,061
\$288,040	2	18	\$23,619	\$1,330	\$24,949	\$25,077	9.0%	8.7%	\$263,091
\$288,520	2	19	\$25,077	\$1,330	\$26,408	\$26,543	9.5%	9.2%	\$262,113
\$289,001	2	20	\$26,543	\$1,330	\$27,874	\$28,017	10.0%	9.7%	\$261,127
\$289,483	2	21	\$28,017	\$1,330	\$29,347	\$29,499	10.5%	10.2%	\$260,135
\$289,965	2	22	\$29,499	\$1,330	\$30,829	\$30,989	11.1%	10.7%	\$259,136
\$290,448	2	23	\$30,989	\$1,330	\$32,319	\$32,487	11.6%	11.2%	\$258,129
\$290,932	2	24	\$32,487	\$1,330	\$33,817	\$33,993	12.1%	11.7%	\$257,115
\$291,417	3	25	\$33,993	\$1,330	\$35,323	\$35,508	12.7%	12.2%	\$256,094

As noted, the implicit LV ratio is growing as the equity is drawn down in the periodic payments.

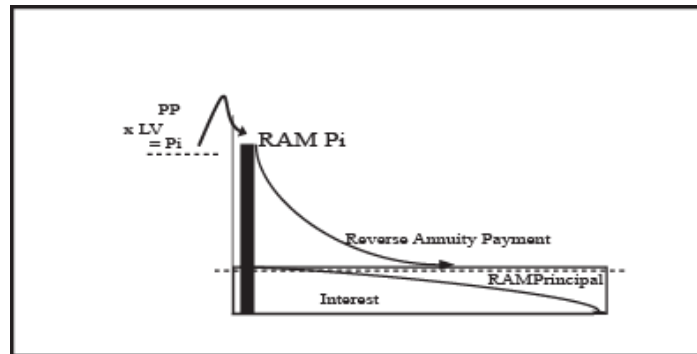
Table 39 (b): Terminal Value of RM, 10 Year Hold

\$335,171	10	109	\$194,526	\$1,330	\$195,856	\$196,910	70.3%	58.7%	\$139,314
\$335,729	10	110	\$196,910	\$1,330	\$198,240	\$199,307	71.2%	59.4%	\$137,489
\$336,289	10	111	\$199,307	\$1,330	\$200,637	\$201,717	72.0%	60.0%	\$135,652
\$336,849	10	112	\$201,717	\$1,330	\$203,047	\$204,139	72.9%	60.6%	\$133,803
\$337,411	10	113	\$204,139	\$1,330	\$205,469	\$206,575	73.8%	61.2%	\$131,941
\$337,973	10	114	\$206,575	\$1,330	\$207,905	\$209,024	74.7%	61.8%	\$130,068
\$338,536	10	115	\$209,024	\$1,330	\$210,354	\$211,487	75.5%	62.5%	\$128,182
\$339,101	10	116	\$211,487	\$1,330	\$212,817	\$213,962	76.4%	63.1%	\$126,284
\$339,666	10	117	\$213,962	\$1,330	\$215,293	\$216,451	77.3%	63.7%	\$124,373
\$340,232	10	118	\$216,451	\$1,330	\$217,782	\$218,954	78.2%	64.4%	\$122,450
\$340,799	10	119	\$218,954	\$1,330	\$220,284	\$221,470	79.1%	65.0%	\$120,515
\$341,367	10	120	\$221,470	\$1,330	\$222,800	\$224,000	80.0%	65.6%	\$118,567

In essence, the borrower is “Paying” the market rate of interest to the lender. In many cases, up-front fees could be a significant item and should be carefully considered especially in light of uncertain holding periods.

Reverse Annuity Mortgages (RAM)

A Reverse Annuity Mortgage is a variation on the RM. Both instruments can appeal to older homeowners, many are in a situation in which they are long on real estate and short on income and liquid assets. At the same time, many own their personal residence outright.



Since they have limited or reduced income, they may not qualify for a traditional mortgage in which the lender looks to the MCR to ensure the borrower has sufficient income to cover fixed mortgage payments. At the same time, the value of the house is adequate to ensure that there is sufficient capital to repay the loan after the house is sold. While the homeowner could sell their house and use the proceeds to generate current income, this approach has several disadvantages (e.g., tax implications, loss of control via ownership transfer, and ineligibility for needs’ based entitlement programs). The Reverse Annuity Mortgage (and its companion, the Reverse Mortgage) were designed to address this demand. In the RAM, the specified amount of capital based on an LV ratio would effectively be transferred to the borrower up front, with the proceeds used to fund a fixed-term, fixed rate annuity. This annuity, which would earn interest, would be drawn down over time, holding the loan constant. At the end of the term of the annuity, the lender would have a claim against the collateral value of the property equal to the value of the annuity. In case the property was sold prior to the liquidation of the annuity, the proceeds could be distributed to the borrower and/or their heirs. In case the owner wished to retain ownership beyond the term of the annuity, the arrangement could be repeated or the mortgage could be refinanced.

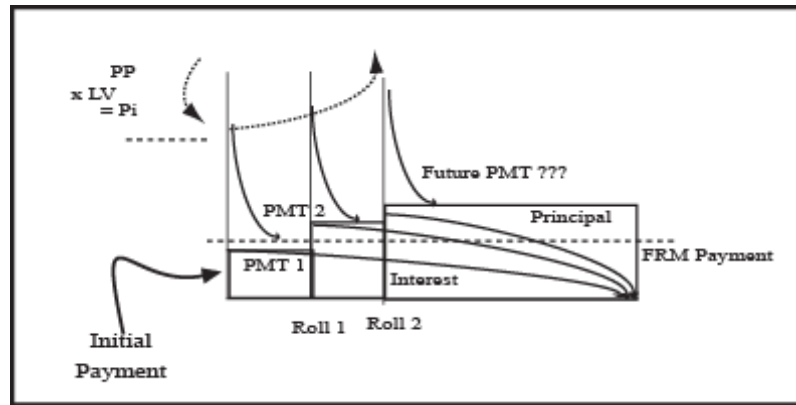
Other Mortgages

Operating Period

Renegotiable Rate Mortgages (RRM)

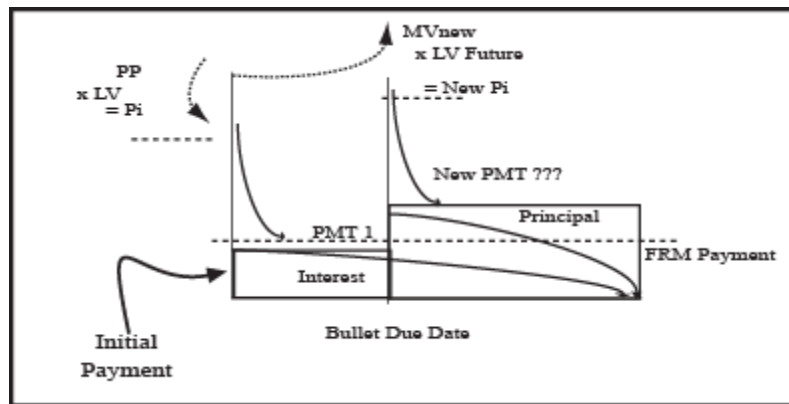
The Renegotiable Rate Mortgage is comparable to the ARM loan in some respects, although the loan arrangement may expose the borrower to greater payment risk since the pay rate may not be capped, depending on how the arrangement is structured. In essence, and RRM begins as though the mortgage is a long term amortizing loan.

However, at pre-specified intervals the outstanding balance is due in full as a balloon payment. The objective of the use of the long term amortization payment with a short term obligation due date is to reduce the period over which the lender must assume the interest rate risk. The alternative of merely shortening the term of the mortgage would unduly increase the required mortgage payment. In ARMs, the rate of interest is automatically adjusted up or down depending on changes in the specified index. However, in a RRM the rate is “renegotiated” at set intervals. In essence, this renegotiation will depend on then-current mortgage market conditions, rather than on some specified index. This feature protects the lender from spread compression which may occur between various indices and actual mortgage terms. To protect the borrower, the lender typically guarantees the “renegotiation or rollover” of the outstanding principal balance, thus ensuring that funds will be available to continue supporting ownership of the underlying property. Since a new mortgage is not required --the current loan is merely “renegotiated” the lender can maintain a first mortgage claim. This has the advantage of avoiding the potential introduction of a superior lien by third parties and reduces the costs associated with the loan underwriting process.



Bullet Mortgages (BuM)

A Bullet Mortgage is more common in commercial transactions, although it may be applied to residential transactions as well. In essence, a BuM involves a mortgage arrangement in which the principal is due at some pre-specified period prior to the amortization term of the loan.



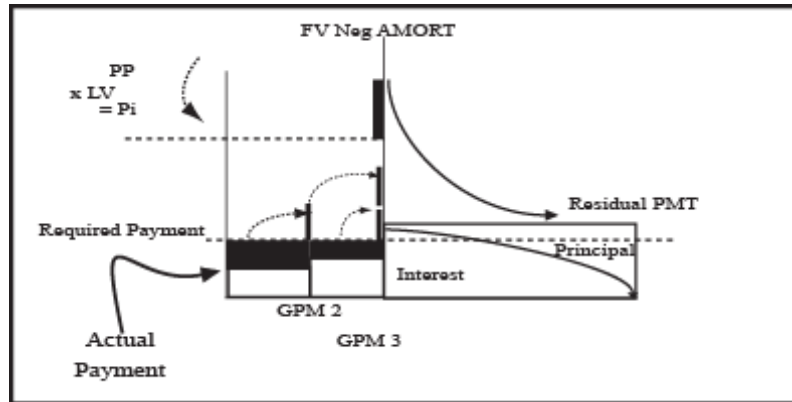
This arrangement allows the borrower to stretch payments over a longer period thus reducing the amortization component. However, there are no guarantees that the lender will be willing to roll the loan over at the maturity dates, exposing the borrower to liquidity or refinancing risks. In some cases, the lender will be willing to offer a new mortgage to avoid the risk of foreclosure. However, if the market value declines or the borrower is not “eligible” for a new mortgage due to LV restrictions or MCR, the lender can force repayment thus triggering liquidation of the asset and repayment or initiating foreclosure proceedings.

Back-end Mortgages

Negative Amortization Mortgages (NAM)

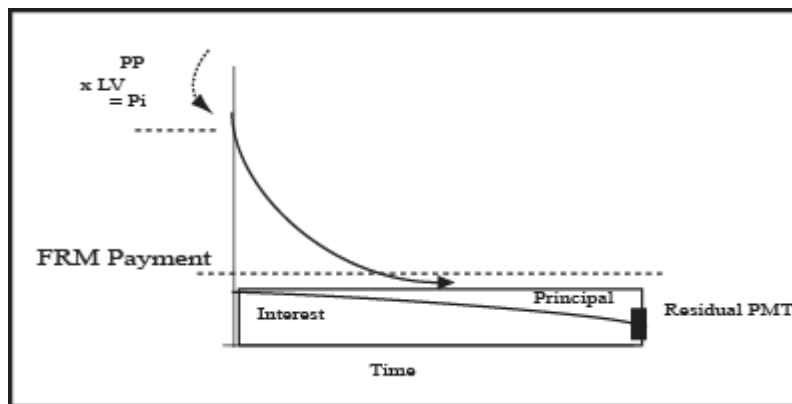
The general class of Negative Amortization Mortgages feature payments that are below the levels warranted by market interest rate levels, but which are subsidized to earn interest at the market rate through increases in the principal

balance due at the end of the mortgage term. In essence, the principal balance increases to provide a premium upon sale or repayment which protects the yield to the lender. In a Negative Amortization Mortgage, the periodic payments are set at a level below that required to amortize or provide a return “on” and “of” the amount of the loan. This lower “pay rate” is offset by an accumulation of the deficiency which is compounded forward and added to the outstanding principal balance. In effect, the borrower would be increasing the loan above the amount supported by the initial LV ratio. If the property appreciates at a faster rate than the accumulation of the deficiency, the implicit, current period LV ratio can actually decline, thus providing a greater cushion against losses in the event of foreclosure. In some cases, the principal balance is capped at some LV ceiling based on current market values. In these cases, the principal balance can be frozen, forcing an increase in the required payments to provide some level of mortgage amortization.



Balloon Mortgages (BaM)

A Balloon Mortgage is a form partially amortizing loan wherein the periodic payments are established at a level which will leave a residual payment at the end of loan term. The underlying strategy is to reduce periodic payments by shifting a portion of the amortization to



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back-end of the transaction. In essence, the agreed residual principal balance is established prior to inception. This may be a fixed dollar amount, a percent of the initial value, or a percent of the anticipated value given expected property appreciation. Regardless of how it's set, once the future dollar value of the terminal position is established, the sinking fund or bond equivalent draw to grow to that amount would be calculated. This figure would then be subtracted from the required payment necessary to fully amortize the loan, generating a net payment. Upon termination, the borrower would sell or refinance the property and pay the outstanding principal balance in a lump payment.

Conclusion

The stated objective of this primer was to illustrate the mechanics of the traditional and alternative mortgage instruments. As noted in the discussion, despite the simplification and standardization of the underlying assumptions, to achieve this objective, we had to plough through a rather extensive list of charts, graphs and tables. Hopefully you developed a conceptual understanding of the underlying mechanical steps so you can replicate them using Excel's built-in functions or other financial tools. Assuming you can model the basic mortgages, you should be able to change assumptions to reflect "real world" expectations. This will allow you to understand the inherent risks built into the various instruments, and suggest how you might structure and price various mortgage instruments to compensate for such risks. You should also be in a position in which you can combine elements of the various instruments to generate customized solutions that can be used to create win-win solutions for classes of lenders, investors and borrowers, each with their own risk-return thresholds. Happy modeling.